ISSUED EVERY MONDAY AT 430 W. FORT ST., DETROIT 26, MICHIGAN. ESTABLISHED 1926.

AIR CONDITIONING & REFRIGERATION News

THE NEWSPAPER OF THE INDUSTRY

Vol. 65, No. 16, Serial No. 1205 **April 21, 1952** Subscription Price, $5 Per Year

Entered as second-class matter October 3, 1936 at the post office at Detroit, Michigan, under the Act of March 3, 1879.
Trade Mark Registered U. S. Patent Office. Copyright 1952, by Business News Publishing Co.

INSIDE DOPE

by GEORGE F. TAUBENECK

Stories of the Week
Gags of the Week
Silly Smirks
Out of Our Mailbag

Stories of the Week

One of America's better refrigeration dealers has a brother-in-law scientist who works on the Atom Bomb Project.

"Honestly, Joe," our dealer-friend probed, "can your fantastic weapons destroy the world?"

"Perhaps. But don't worry. After all, our planet is a minor speck of dust in the universe."

There are camera "bugs" everywhere; and amateur photography is a hobby which sometimes borders on paranoia, as the writer can testify.

Take the hobbyist who announced he was going to take a picture of a total moon eclipse.

"How you gonna get it on film?" dubioused a friend.

"Oh, that's easy I got me a flash bulb attachment."

According to Detroit newspapermen who were waiting out an all-night bargaining session between the CIO and an automotive firm, a negotiator burst out of the conference room and took several deep breaths.

"Gotta calm down," he muttered.

The reporters went on playing poker.

"Say, boys, mind if I join you?"

They dealt him in, and he stayed for an hour, with less than good luck. Refreshed, he cashed in his chips, arose, stretched, and smiled broadly. Thereupon the wage-bargainer charged menacingly over to a wall mirror, practiced scowling until his phiz was formidable indeed, and . . .

Ranged his way through the door to the conference room.

The boys could hear him blustering inside.

Gags of the Week

"That's the spirit!" exulted a "medium" when her *seance* table rose into the air.

Washing a dog isn't so difficult. All you need is three cakes of soap, four tubs of water, and five hands.

"In case of an air raid, go at once to the nearest slot machine. It hasn't been hit in years."—*Krochler News.*

Silly Smirks

Use the following words in a sentence:

Pencil.

"If I don't wear suspenders my *pencil* fall down."

Samovar.

"Yes, *samovar* best people belong to this club."

Satiate.

"They *satiate* four chocolate sundaes for lunch."

Osmosis.

"Where *osmosis* when the lights went out?"

Euripides.

"Valet, if *Euripides* pants I killa you."

Da Vinci.

"Si, senor. *Da Vinci* blow lak hurricane."

Ostend and *innuendo.*

"Madame, would you mind if *ostend* here and look *innuendo?*"

Out of Our Mailbag

Paris, France

Editor:

I will tell you a good one and which has the superiority on those you generally tell.

A few days ago, I was in Bahrain (actually, nobody knows where it is, except one or two pilots of the Middle-East Air Line).

I was taking pictures there and an American fellow who was taking pictures, too, crossed my way. We took a little chat and after five minutes we were friends from childhood (you know how are those American guys).

(Concluded on Page 8, Column 4)

Airtemp Offers 100-Ton Package Air Conditioner

DAYTON—A 100-ton self-contained "package" air conditioner is being introduced by Airtemp Construction Corp. here, subsidiary of Chrysler Corp.

Already in production, the new 100-ton unit is factory assembled and shipped as a complete unit. It is ready for use after connection of the condenser cooling water lines, drain lines and electrical supply.

It was developed for commercial and industrial use and is adaptable for free blow applications or with ductwork for central station applications.

Claimed as advantages for the 100-ton unit are: (1) Reduction of field labor. Its refrigeration piping is factory fabricated and factory tested.

(2) Compactness. It produces one ton of refrigeration for each .76 sq. ft. of floor space occupied by the unit and weighs only 140 lbs. for each ton of refrigeration capacity.

(3) Flexibility. It can be employed in multiple or relocated in the event of business expansion, remodeling,

(Concluded on Back Page, Column 3)

Crosley Drops Prices on 3 Refrigerator Models

CINCINNATI—Crosley Div., Avco Mfg. Corp., has lowered the prices of two refrigerator models $20 and that of a third model $15.

Prices were reduced as follows: UD 7, from $214.95 to $199.95; UD 10, from $289.95 to $269.95; SD 95, from $319.95 to $299.95.

A company spokesman said the changes were not price cuts but "readjustments" designed to put the 1952 refrigerator line on a smoother price basis.

Time 'Trol Turns Conditioner on, off

NEW YORK CITY—A portable, automatic timer switch for air conditioners up to ¾ hp. capacity that will automatically turn the unit on and off at any desired time has been developed by Walter H. Steiner and is being distributed by the Time 'Trol Co. here.

Steiner has been in the air conditioning field since 1928 and has been associated with Kelvinator and Philco distributors as air conditioning sales manager.

The "Time 'Trol" is timed by Tork and motored by Telechron. It has a 24-hour dial, divided into four six-

(Concluded on Page 4, Column 1)

Sears Set To Market Mitchell Conditioners

CHICAGO — Following the recent agreement by Sears Roebuck & Co. with Mitchell Mfg. Co. to handle Mitchell air conditioners, a meeting was held recently between 115 Sears Greater Chicago store managers, two Mitchell representatives, and representatives of Hallicrafters-Chicago, Mitchell distributors in the Chicago area.

Held in the Conrad Hilton hotel, the meeting was led off by a showing of the new Mitchell sales instruction film, "A Midsummer Night's Dream."

It was pointed out in the meeting that this is the first time since the war that Sears has handled a major appliance under a national manufacturer's own trade-mark.

Another Season Opener —In Air Conditioning

Readers will note that the editorial matter in this issue of the NEWS is heavily concentrated on the subject of air conditioning.

While news and developments in the air conditioning field are covered regularly in the weekly issues of the NEWS, editors have made it a practice, in the past several years, of taking one issue each spring and making it a "kickoff" issue for the air conditioning selling season.

So, in this issue you'll find such articles as "Doing Business With the Air Force"; "Multiple Room Cooler Sales"; "Package Store Units Handle 'Impossible' Locations for Comfort Cooling"; "Where Is Small City Market for Air Conditioning"; "Air Conditioning Advertising?—Is it In a Rut?"; "Handling Air In Atomic Plants"; "Variety of Application—From Heart Patients to Premature Infants, From Seed Firms to Breweries, Air Control Is on the Job."

Technical and maintenance aspects of the field are covered in such articles as "Humidity Control Simplified?"; "Design, Use of Air Conditioning Controls" (by an Armed Forces engineer); "Sausage and the Heat Pump" (a new aspect in the application of the heat pump); and "Florida Air Conditioning Dealer Installs Equipment To Minimize Continuing Maintenance" (a complete story on maintenance contracts for air conditioning).

New Worthington Units Introduced

NEW YORK CITY—Several new air conditioning and refrigeration products, including new models of 10-ton and 15-ton package air conditioners, have been introduced by Worthington Corp. in a series of distributor sales conferences which wound up here late last month.

Other new products brought out by Worthington include new room conditioning units for use with central systems, a line of two-stage "Freon" compressors, liquid cooling units, and a large central station air conditioning unit.

Worthington's sales in this field have increased by 800% in the past 10 years, declared M. M. Lawler,

(Concluded on Back Page, Column 2)

Where's Best Potential, Room Coolers or TV?

CAMDEN, N. J.—Which has the biggest potential market—television or room air conditioners?

According to some statements made by representatives of RCA Victor Corp., which is in both fields, the room air conditioner market has the larger "theoretical" potential. There are 39 million electrified homes in the United States, and several rooms in each home in which air conditioners might be installed; whereas, except in few instances, most homes represent a market for only one TV set.

Furthermore, the prospective market in business, commercial, professional, and industrial establishments, is a much wider one for the room air conditioner than it is for TV.

Westinghouse Anticipates Double Appliance Volume

MANSFIELD, Ohio—Present volume of the electric appliance business done by Westinghouse should double in the next 10 years, it was predicted by J. H. Ashbaugh, vice president, at a meeting of the stockholders of the company here April 16. It was the first meeting of Westinghouse stockholders to be held in Ohio and some 450 attended.

The head of the Westinghouse ap-

(Concluded on Back Page, Column 2)

New 2-Door, 2-Temp. Kelvinator Aims at Replacement Market

DETROIT, April 16—A new Kelvinator two-door two-temperature refrigerator aimed at the replacement market was announced today by C. T. Lawson, vice president in charge of sales.

The new refrigerator-freezer combination has two doors, a self-defrosting lower compartment for normal household refrigeration needs, and a separately controlled and separately insulated home freezer compartment across the top.

It has an over-all capacity of 9.4 cu. ft., and is a companion to the 12-cu. ft. model MT combination already in the company's line, in everything but size. The cabinet of the KT is only 28¼ in. wide, 29⅝ in. deep, and 59 in. tall.

Stating that the new model has "three important advantages," Lawson said that—

"The popular cabinet widths of 10 to 15 years ago were 28 to 29 in., as compared with 30 to 32 in. today. The KT is a two-temperature model slim enough to fit into the space oc-

(Concluded on Page 29, Column 2)

IN THIS ISSUE

Improper Operation, Maintenance can Nullify Good Air Conditioner Design 2
Pointers on Doing Business with the Air Force 6
110 Window Units Help Night Shift Workers Sleep 10
Room Coolers Preserve rare Violin, Pamper Prize Pup 10
'Package' Store Units Handle 'Impossible' Locations for Comfort Cooling 11
Statistics Show Where Small City Air Conditioner Market Is 12
Humidity Control Simplified? 13
How About Advertising All the Advantages of Air Conditioning, Economist Asks? 14
Air Handling in Atomic Plants 17
Design and Use of Air Conditioning Controls 22
How One Air Conditioning Dealer Writes and Handles Maintenance Contracts 24
The Sausage and the Heat Pump 26
What's New 18
Current Literature 20
Refrigeration Problems—Automatic Defrosting 28
Government Contracts 31

Activity Lessens In Freezer-Food; Grocers Slap It

Results 'Fair' for Some Promotions In Midwest; 'Crackdown' on Claims

DETROIT—The almost frenzied activity on the freezer-food plan front diminished a bit during the past week.

However, some distributors and dealers were still experimenting with various schemes as others pushed their programs via newspaper, radio, and television advertising.

Meanwhile, opposition to the plans by-passing the retail grocer mounted in some branches of the food industry. And in some areas steps were being taken to tone down the claims being made in freezer-food plan advertising.

Latest developments follow.

Detroit Plans Get 'Fair' Amount of Response

DETROIT—Public reaction to the package "G-E Food Freezer Club" plan announced here April 9 and 10 has been "very surprising for such an early date," a spokesman for General Electric Supply Corp. said last week.

At the same time, a representative of The Ernst Kern Co., large Detroit department store participating in the local Amana food-freezer program, reported that Kern's has had "fair results" with the plan thus far, though he anticipated stronger activity later.

The G-E plan was introduced jointly by General Electric Supply Corp., the 25 Big Bear Markets, and the 10 retail outlets of Ned's in a newspaper advertisement. The following day, a similar ad announced that the plan was available through all G-E dealers in the area.

"We didn't expect much response for at least two weeks," the G-E Supply spokesman reported. "But within a week, Ned's received about 170 calls and made 65 appointments. And many smaller dealers called in to say they had sold one or two freezers both with and without the added food deal.

"The plan has worked out very well so far for all concerned. However, we don't expect it to really catch on for a while yet."

7 Food Distributors Agree Not To Participate

CHICAGO — Distributors of seven brands of frozen foods have agreed not to participate in freezer-food plans that seem to by-pass food retailers, according to an official of the Associated Food Dealers of Greater Chicago.

He said the distributors at a meeting with the dealers, promised to continue selling through normal trade channels. The distributors handle Birds Eye, Booth, Cedergreen, Honor, Libby, Pict-Sweet, and Snow Crop brands.

Salt Lake City Dept. Store Offers Own Plan

SALT LAKE CITY—ZCMI department store here is offering consumers a freezer-food plan under which they can buy a freezer for around $450 and at the same time get a six-month supply of food at a reported saving of about $55. Valued at $225, the food goes to the freezer purchaser for approximately $170. The plan can be renewed at the end of six months.

Minnesota Code Limits Freezer-Food Plan Claims

ST. PAUL—A code prohibiting the use of certain claims in freezer-food plan advertising has been adopted by the Minnesota Department of Research and Development.

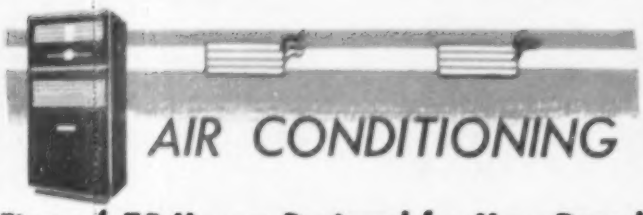
The department said the code was drawn up as the result of complaints about claims made in such advertising. The code bans:

1. The term "wholesale" in advertising claims.

2. Claims of any particular percentage of savings in the price of food bought under such a plan.

3. Claims of "free freezers" or "getting freezers without cost."

(Concluded on Page 4, Column 3)



First of 75 Homes Designed for Year-Round Air Conditioning Opened In N. Y. Development

NEW ROCHELLE, N. Y. — The "pilot" home of a new residential community development at Heathcote Heights here, which will involve 75 homes all air conditioned with Carrier year-round air conditioning equipment, was opened for public inspection recently.

The initial house has been described as a "pilot" home because no two homes in the development will be of the same design, but all will be air conditioned by the Carrier Home Weathermaker. This unit permits extraordinary liberties in design and decoration because the air conditioning reduces outdoor dust, grime, and soot, as well as street noises, to a minimum, the company says.

The development, a project of the Heathcote Heights Development Corp., will be completed early in 1953. Four homes are now under construction in the community, which is located on the Scarsdale line of New Rochelle, bordering Dorchester Road, Barsud Road and Morris Lane. Homes will be priced from $40,000 and up. The price of the "pilot" house is $47,500.

Both air conditioning and heating are combined in the same unit, are controlled automatically by a thermostat, and it is possible to change from heating to cooling and back again by operating a switch in the living room.

The unit operates on any type of gas. The Heathcote Weathermakers are being supplied by Carleton-Stuart, Inc., Carrier distributor in the New York City area.

Light colors and shades predominate in the home decorations and furniture. One room features charcoal carpeting and walls with predominately white furniture.

Other features of the homes are washing machine, drier, dishwasher, garbage disposer unit, refrigerator, range, terrace with barbecue, and bathroom sunlamps.

Heathcote Heights is believed to be not only the largest completely air conditioned community in the country but likewise is the first project in which an entire community has been planned for air conditioning.

Seek To Regulate Use Of Water In Arkansas

LITTLE ROCK, Ark. — General Waterworks Corp., Pine Bluff, has asked the Arkansas Public Service Commission to issue a regulation limiting the use of water for large refrigeration and air conditioning units or requiring operators to install water-saving devices.

The company claimed that such units are endangering the water supply in several Arkansas towns. It said that if the requested regulation is not issued, it will be forced to make expensive additions, such as new wells, storage facilities, and larger distribution lines.

General Waterworks gets its supply of water for utility service from deep wells in Brinkley, El Dorado, England, Fordyce, Gurdon, Hamburg, McGehee, Morrilton, Pine Bluff, and Rison.

Proie Brothers Distributes UsAirco Line In Pittsburgh

PITTSBURGH — Proie Brothers, Inc. here has been named a distributor for window units and store conditioners in the western Pennsylvania and northern West Virginia area by the United States Air Conditioning Corp.

The Proie organization, with offices at 840 Pennsylvania Ave., has been identified with the field of heating and air conditioning supplies for 28 years.

Officers of the supply firm include John Proie, president, and Albert J. Luppino, vice president and sales promotion manager.

Improper Operation, Maintenance of Conditioner Units Nullify Good Design

WASHINGTON, D. C. — "Some people still regard air conditioning as a cold shower, hypodermic, or a shot of oxygen after the night before," declared Ralph Gonzalez, manager of Chrysler Airtemp's Application Department, in a discussion of air conditioning design objectives at a technical conference staged for refrigeration and air conditioning engineers by the United States Air Force.

There is apt to be less difficulty in achieving satisfactory control for a general office, but "when you air condition an office occupied by one person, look out. He's the sole judge of the air conditioning system's performance," Gonzalez said. "You may have to educate him as to what he should expect."

Discussing package units, he pointed out that "after testing we finish up with a balanced system of components. Then we can go into mass production. When testing we can use much more instrumentation at the factory than in the field.

"This doesn't mean," Gonzalez admitted, "that we've reached perfection. We're a long way from it. But there are very definite price and mechanical advantages made possible with package units.

"We can't make a package unit too small, and appearance-wise, we don't have too much to talk about, but the package unit doesn't look too bad in many applications. However, appearance is not too important a factor.

"Reliability of package units has improved, but the manufacturer has no control over keeping the filters clean and preventing the obstruction of return air grilles.

"We are considering the use of manually reset pressure cut-outs so that after the user has had to reset the machine two or three times to start it, he'll investigate to determine the cause of the machine's cutting out."

There are limitations with package units, Gonzalez said, such as the limited amount of flexibility in air quantities. There is also the problem of size.

"Manufacturers have to make a profit so they can only build the size for which there is a volume demand. These are not engineering limitations, however."

As for possible misapplication of package conditioners, Gonzalez said that "most manufacturers insist that where package units can't handle the job they shouldn't be used. This accounts for about 10% of the installations.

"The role of mechanics is an important one in the success of package unit installations, and while not concerned with the over-all design, the mechanics do handle the details.

"Good preventive maintenance is also needed on package units. Besides the usual maintenance, there must be someone who can adjust volume and air distribution. A great weakness is the lack of people who can handle air distribution problems. The industry is growing fast and has a tremendous training problem.

"If equipment isn't operated properly, the best design won't give the desired results. Operation is critical. For example, the system must be started up in advance of use following the shutdown at night or over the week-end in order to remove the accumulated heat."

20-Story Congress Bldg. To Be Air Conditioned

MIAMI, Fla.—Owners of the Congress building here have retained the firm of Frank Watson & Deutschman, architect and engineer, to design a year-round air conditioning system for the 20-story structure.

Frank Watson, a member of the firm, declared it might be the biggest installation of its kind in Florida.

"Chilled water will be circulated in insulated piping to all floors," he said. "In the winter time, hot water will be circulated in the same piping to heat the offices.

"Each office or suite will be able to control the degree of cooling or heat.

"The installation will probably be completed by the spring of 1953."

Lofton Heads A.C. Div. for Cook & Nichol Appliances

MEMPHIS, Tenn.—Cook & Nichol Appliances, Inc., 2870 Poplar, has announced the appointment of W. C. Lofton as general manager of the firm's air conditioning division. Lofton, a veteran of 17 years in the air conditioning business, comes to Memphis from Houston.

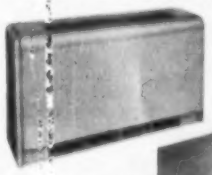
McQuay "RH" AIR CONDITIONERS

for year 'round cooling... heating...

The Dependable Double-Duty Unit

McQuay Seasonmakers

Individual Room Air Conditioners for year 'round service.
(For use with central chilled or heated water or Freon systems)



Floor Type. For free standing mounting beneath a window or along a wall.

Ceiling Type. For suspended mounting.

Also available in basic type for fully recessed installation.
Write for Condensed Bulletin No. 700.

The McQuay "RH" Air Conditioner leads the field for efficient, economical cooling and heating. During hot weather, fresh outside air is filtered, then cooled by either cold water or freon coils. Steam or hot water coils provide warm filtered air for the heating seasons.

For modern shops, stores, offices, beauty parlors, restaurants and taverns, it's a streamlined beauty that can be suspended from the ceiling, mounted on existing fixtures, or installed adjacent to conditioned space.

Famous McQuay Ripple-Fin coils with rugged construction throughout assure long dependable service—and customer satisfaction. In 4 sizes to fit a wide range of requirements. Write for catalog No. 97. Representatives in principal cities. McQuay Inc., 1607 Broadway St. N.E., Minneapolis, Minn.

McQuay INC.

REFRIGERATION • AIR CONDITIONING • HEATING

BABY, IT'S COLD INSIDE!

NEW IMPROVED

CHILL WALK-INS CONTAIN COLD BETTER

BECAUSE . . .

Experience proves that Chill construction guarantees you more refrigeration for your cold cash dollar.
Each CHILL Walk-in Cooler is CUSTOM CONSTRUCTED with the improved LOCKSEAM positive joint method.
LOCKSEAM means precision fit joints, fast installation; requires no wrench, no clamps, no stripping. With LOCKSEAM, coolers are built to fit.

Write, wire or phone us at COlfax 0023 for information or quotations. Orders or requests for quotations should be accompanied by a rough sketch showing door swing, door placement, size, etc.

MIDWEST MANUFACTURING COMPANY
2816 Dupont Ave. S. Minneapolis 8, Minn.

CHILL

Any size compressor can be air cooled!

UNICON by KRAMER

REMOTE TYPE AIR COOLED CONDENSER

WHAT'S BEHIND A TRADITION?

Traditionally, each baseball season is opened when the President of the United States "throws out the first ball." William Howard Taft, a former Cincinnati semi-pro pitcher, was asked to open the 1912 baseball season by throwing a baseball from his field box. This caught the public fancy and has been continued by every President since Taft.

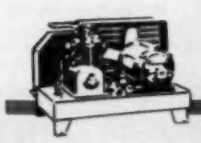
the Copeland tradition based on engineering insight and foresight.

Copeland's traditional leadership in refrigeration was begun by an engineering department which pioneered automatic electric refrigeration. Copeland engineers maintained traditional leadership by continually remaining ahead of competition; by increasing Copeland's leadership step by step.

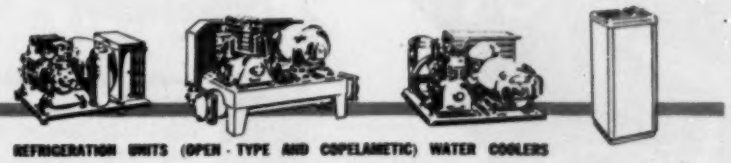
Development of COPELAMETIC . . . the ACCESSIBLE hermetic . . . was the longest stride forward. Realizing that 9 out of 10 service calls were due to belts, seals and improper lubrication, Copeland's engineers designed a refrigeration unit which *actually eliminated these causes of refrigeration failures.*

With the causes of frequent field servicing eliminated, Copeland's engineers also provided ACCESSIBILITY. Valves and pistons can be serviced on the spot. A COPELAMETIC is built to provide maximum refrigeration with minimum service trouble.

COPELAMETIC . . . the ACCESSIBLE hermetic, is first choice for all types of installations. Wherever there is need for uninterrupted refrigeration, COPELAMETIC is the answer. Air-cooled COPELAMETICS are built from 1/6 HP through 3 HP. There are water-cooled COPELAMETICS from ⅓ HP to 7½ HP, inclusive.



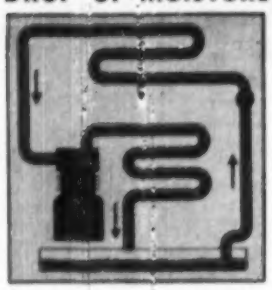
Copeland
DEPENDABLE *Electric* REFRIGERATION



REFRIGERATION UNITS (OPEN - TYPE AND COPELAMETIC) WATER COOLERS

COPELAND REFRIGERATION CORPORATION · SIDNEY, OHIO

TRAVELS TO EVERY DROP OF MOISTURE

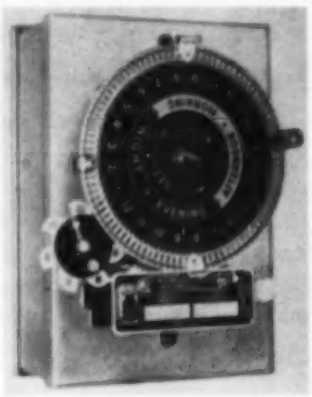


Thawzone circulates with the refrigerant to reach ALL the moisture. Gets to any moisture traps in expansion valve, receiver, etc.

By a patented method Thawzone actually destroys moisture so it can't come back. For any "Freon" or methyl chloride units. Phone your wholesaler now.

TH WZONE®

Redmond
MICROMOTORS
Prompt shipment!
74 different models in stock
FACTORY DISTRIBUTORS
CYCLO-FREEZ CORP.
MARVIN L. "FERGIE" FERGESTAD
2120 S. Lyndale, Dept. A, Mpls. 5, Minn.



Time 'Trol--

(Concluded from Page 1, Column 2)

hour periods — morning, afternoon, evening, and night.

It has two sets of "on" arms and two sets of "off" arms, allowing for two settings daily. Model 9152W has an "omit" wheel, which allows the setting of air conditioners to remain "off" any day or combination of days desired.

Time 'Trol will automatically turn the air conditioner on again at the time set, on the day when operation is desired. Unless the setting is changed, it will continue to operate each week on set schedule, Steiner said.

No installation is required, the unit merely plugs in. Its switching mechanism has been used for nearly 30 years in the electrical control field.

Time 'Trol Co., 155 Liberty St., New York 6, is sole distributor.

'Freezer-Food Plan'--

(Concluded from Page 1, Column 3)

4. Advertising of individual cuts of meat at carcass costs.

Companies against whom complaints were filed have agreed to accept the new code, according to Commissioner James W. Clark.

Philadelphia Plan Designed To Sell Deepfreeze First

PHILADELPHIA — A Deepfreeze freezer-food plan has been launched by Philadelphia Distributors here that permits consumers to purchase a six-months supply of frozen meats and a four-months supply of other frozen foods with the freezer.

John Signor, advertising manager, said that both the freezer and food can be financed together with the monthly payment to include both.

"It is our plan to sell Deepfreeze first, not the food plan," Signor declared. He said that dealer salesmen were being provided with a catalog and slide rule to show the prospect how much money he saves under the plan. Actual savings should amount to about 15% on meats and 20% on other foods, he indicated.

The frozen foods are being purchased through the Food Bank, frozen food supplier of Parkersburg, Pa.

Michigan Grocers Promise Fight If Plan Persists

DETROIT—*The Grocer's Spotlight*, a food industry newspaper, declared in a front-page article that introduction of freezer-food programs in Michigan has aroused retail grocers of the state "to a fighting spirit which promises war on the new promotional plan."

The article appeared under an eight-column headline reading: "War Declared on Home-Freezer Plan for Wholesale Food Sales Direct to Consumers." The sub-head said: "Deceptive Advertising Promises 'Savings' to the Public Which Will Not Be Realized."

The article, which took up almost half the front page of a recent issue, said in part:

"This form of direct selling to consumers will be fought on a very keen competitive basis by independent retail grocer groups and by several chain store groups. A top executive of one of Michigan's largest supermarket chains . . . stated:

" 'If appliance dealers persist in furthering the home freezer plan in our area we will open up appliance departments in all of our stores and offer this equipment at cost prices. Macy's have never yet cut costs or made such offers on freezer equipment as our plans call for, if we are pushed to it.'

"In Detroit, the Associated Food Merchants at a special emergency meeting . . . declared all-out war on the home freezer plan. Among other steps, the retailers have asked the OPS to look into the legality of the tie-in prices under sections 24 and 25 of OPS regulations. They have also asked Better Business bureaus to investigate possible false advertising.

"Reliable meat men interviewed by *The Grocer's Spotlight* are of the opinion that the offers made in the home freezer plans are misleading.

"One of the half truths in this type of advertising is to claim that steaks and other choice cuts can be bought for 65 cents a lb.; but neglect the important fact that a half or quarter of beef must be bought to secure this price—which means that bone, sinew, fat, as well as large quantities of cheap cuts must be bought at the same price. So actually, the consumer who takes on this deal saves little, or may actually lose.

"We are most amazed of all to note that Big Bear Markets of Michigan have lent their name and reputation to a scheme of this kind, so that a certain equipment firm can sell more units.

"How does this retailer know that the equipment house may not eventually take over the selling of frozen foods as well as the equipment, after getting freezers in the homes?

"It is high time for equipment people as well as for food distributors to recognize that they owe a moral responsibility to retail grocers whom they once called their customers, and perhaps still are their customers.

Cleveland BBB Concerned Over Exaggerated Claims

CLEVELAND — Exaggerated savings claimed for food-freezer plans here have aroused concern on the part of the local Better Business Bureau, according to Mrs. Josephine Schulkins, director of the BBB's merchandise division.

"There is nothing wrong with the plans," Mrs. Schulkins admits, "but the savings claims are extravagant. There just isn't that kind of markup on food.

"Many dealers are advertising savings of 'up to 30%' on food. We checked on how they arrived at the figure and we found the costs of shoe leather, gas, shopping time, and impulse buying are included.

"Another thing, one advertisement promised steaks and roasts at 65 cents a lb. when a quarter of beef is bought for the freezer. But there is a lot of waste on a quarter and the customer would pay 65 cents a lb. for that, too."

BBB investigations indicated that freezer buyers could not hope to get more than a 10.4% markdown on meat, Mrs. Schulkins said.

Bernard Dittman of Dittman's appliance store declared, "I talked to Mrs. Schulkins and she wasn't critical of the plan. We have the facts and figures to back up every one of our claims.

"The National City Bank is behind our financing. You can bet they wouldn't back something that wasn't sound."

A. F. Head, district manager of the General Electric Supply Corp. here stated: "Our advertising was cleared with the Better Business Bureau. We claimed savings of up to 30% on costs of food and shopping.

"Average savings by buying in quantity will be in excess of 20%. Then you have to add the housewife's shopping time and the cost of driving a car to the market."

"Yes," Mrs. Schulkins admitted, "we checked the ads. But they didn't make the corrections we asked them to."

Western Grocers Included In Distributor's Plan

LOS ANGELES—Grocers are now being offered this food plan by United Ice Co., which distributes frozen foods in California and Nevada:

The grocer accepts minimum cash orders of $25 for a variety of foods, which are delivered by the distributor. The latter bills the grocer at regular wholesale prices and the grocer adds 5% to the customer's bill.

LOOK AHEAD
WHEN YOU SELL
AIR CONDITIONING

Satisfied customers can send you *more* business. And the easiest way to satisfy an air conditioning customer is to sell him a Carrier Weathermaker.

Because Carrier Weathermakers come in five in-the-space sizes from 3 to 15 hp., you can make sure that the customer gets the right size to meet his present needs or provide for future expansion. Add to that the other exclusive advantages found only in Carrier Weathermakers — Controlled Cooling, Humitrol, Even-flo air distribution, Whisper-quiet Q-T fan — and you have a sure-fire formula for satisfying customers.

So look to the future when you make today's sale. Keep your customers rooting for you. Your future business depends on it. Sell Carrier Weathermakers. For information, write Carrier Corporation, Syracuse, New York.

Carrier AIR CONDITIONING REFRIGERATION

Here's a New Idea That Sells!

It's the Carrier Weathermaker Home . . . built around year-round Weathermaker air conditioning. It gives the home owner a better home—gives you bigger sales.

Equipped with Universal Hermetic Unit.

Designed especially for Clubs, Taverns, Night Clubs and other types of businesses.
A FAST SELLING MONEY MAKER!

The Originators of the
COMBINATION ICE CUBE MAKER & BEVERAGE COOLER
Gleaming Stainless Steel with Sliding Doors

Model 1-6, 6 Ft. Self-Contained unit that makes 150 lbs. of ice cubes and dry cools 2000 12-Oz. bottles daily.

REMOTE TYPE MODEL 1-6 dry cools 2300 12 oz. bottles daily. Provided with adjustable separators for 10 different brands of beverages.

POLYTHYLENE ROTO TRAYS
Just twist and you have as many ice cubes as you need at any time.

3-INCH INSULATION
WATERPROOF TANK
STAINLESS STEEL FINISH FRONT
4-5-6-7-8 FT. SIZES, 27" W., 39" H.

For Full Information and Prices Write to:

4-BROTHERS REFRIGERATION MANUFACTURING CO.
Factory and Showroom
1427-31 So. 8th Street
Philadelphia 47, Pa.

Exclusive Franchise in your Territory available to dealers and distributors. Please write or call.

Eliminate all water problems!
UNICON by KRAMER
REMOTE TYPE AIR COOLED CONDENSER

He doesn't worry about the weather...

...his room conditioner is dependable because it is equipped with a TECUMSEH HERMETIC

Send for complete specifications on these 1/3, 1/2 and 3/4 H.P. air conditioning compressors today.

Mark Twain said: "Everybody talks about the weather, but nobody does anything about it."

Today people are doing something about the weather—they are air conditioning their offices and homes for better working and living comfort . . . and if you are one of the manufacturers of these room conditioners, it will more than pay you to investigate Tecumseh's line of hermetics.

Built upon the idea that the refrigeration industry needed a smoother, quieter, more dependable unit, Tecumseh engineers have developed the Tecumseh Single and Twin Cylinder Hermetic Units and Compressors. Free from vibration because they are internally cushioned, these Tecumseh Hermetics bring to the air conditioning industry low-cost, high-capacity condensing units that develop peak performance with minimum size.

If you need a heavy duty compressor that will stand heavy loads under tough conditions, you can rely upon the complete year-in and year-out dependability of Tecumseh.

TECUMSEH CHIEFTAIN

TECUMSEH PRODUCTS

TECUMSEH, MICH. *Company*

EXPORT DEPT.: 2111 WOODWARD AVE., DETROIT, MICH.

★ The world's largest producer of compressors and condensing units for the refrigeration industry. ★

Doing Business with the Air Force

Much Refrigeration, Air Conditioning Equipment Is Purchased Direct at Air Base; Get Acquainted with 'Base Level' Personnel for Local Jobs

Continued expansion of the defense program by the United States to meet the threat of Communism offers both a challenge and an opportunity for our industry. And by "industry" we mean not just the manufacturer, but the parts wholesaler and contractor as well.

The Air Force offers a prime example. When we think of the Air Force we usually think of jet fighters, long-range bombers, and other fighting machines that border on the fantastic, but the Air Force also uses a tremendous amount of refrigeration and air conditioning equipment. The average base, for example, has 400 refrigeration units.

Most of this equipment is purchased at the base itself, not at Headquarters in Washington. So the contractor has an excellent opportunity to do business with the Air Force base in his locality. The accompanying article gives an outline of how he should go about it.

By C. Dale Mericle

WASHINGTON, D. C.—"How to do business with the Air Force" is a subject that may become of increasing interest to all levels of the air conditioning and refrigeration industry as the defense program continues to expand.

Because of this, some attention was given to the topic when Headquarters of the U. S. Air Force held a technical conference recently at Bolling Air Force Base here for its refrigeration and air conditioning engineers with numerous representatives of industry present.

Lt.-Col. J. E. LaBuda and William F. Smith of the Air Force Directorate of Installations outlined some of the basic problems involved and suggested how industry might approach the Air Force with respect to bidding on equipment and jobs at the bases scattered throughout the continental United States.

The number of these bases runs into three figures, and previously published articles in AIR CONDITIONING & REFRIGERATION NEWS have revealed that as many as 400 refrigeration units are operating at the average base.

At the Air Force conference there was also considerable discussion of Air Force Regulation No. 91-8, which sets up the design and installation requirements to be followed when refrigeration, air conditioning, mechanical ventilation, evaporative cooling, and ice manufacturing equipment are installed at Air Force bases.

Guide to Contractor

Some details of the latest AFR 91-8, as it is known, will be published here to guide contractors and others as to what the Air Force expects in the design of the equipment and the manner of installation.

No attempt will be made in this outline to discuss all aspects of Air Force purchasing. Rather it will be limited to the buying of refrigeration and air conditioning equipment for existing installations, most of which is done at the point of use, that is, the individual Air Force base.

At first glance, the organization and purchasing methods of the Air Force can appear somewhat confusing to the civilian.

Even in a recently published "Guide for Selling to the United States Air Force," this tremendously important arm of defense admits: "The *how* of Air Force buying or contracting is simple in principle but somewhat more complicated in everyday practice."

Industry representatives at the conference were told by Smith: "Our organization is quite comparable to yours. We are broken up somewhat like an industry."

By that Smith was referring, in part, to the division of the Air Force into so-called "Major Commands." There are several and include, for example, the Strategic Air Command, Military Air Transport Service, Air Materiel Command, and others.

Each individual Air Force base will be in one of the Major Commands.

But of special interest to the refrigeration and air conditioning industry is the "Directorate of Installations," which, as the name implies, has the direction of the installations for the Air Force hangars, barracks, offices, etc. The Directorate includes air conditioning and refrigeration installations, along with electrical, plumbing, etc.

As such, it sets up guides for installation of this equipment, and has the over-all responsibility for seeing that the equipment is installed, serviced, and maintained according to regulation. Thus, the Directorate promulgated the previously mentioned Air Force Regulation 91-8.

No Purchasing Done At Headquarters

The Directorate of Installations does no actual purchasing itself at Headquarters level, however. In other words, air conditioning equipment for an installation at Kelly Air Force Base in Texas, for example, would not be purchased by an officer assigned to the Directorate at the Pentagon in Washington but at Kelly Air Force Base.

The Directorate at the Pentagon, however, might review the plans for the proposed installation as submitted by Kelly Air Force Base and give its approval (or not) for the installation. But the equipment would be purchased at the base.

This applies to equipment which goes into existing Air Force installations. New construction projects are handled in a somewhat different manner.

New Construction Handled at Pentagon

These originate at Headquarters in the Pentagon and the project is then turned over to the Corps of Engineers which either does the job itself or lets contracts to have it done. Construction of an entirely new Air Force base or a "climatic hangar" like the famous one at Eglin Field in Florida are typical projects handled by OCE, as it is known.

Just Like Big Business

To civilians this arrangement may appear confusing, but industry operates on somewhat the same basis itself. If General Motors Corp., let us say, planned to build a new $100,000,000 plant for its Frigidaire Div., the contract, etc., would most likely come across the desk of President Wilson in the G. M. Bldg. in Detroit.

If, however, the boss of a tool room in the Frigidaire plant in Dayton decided that he needed a new turret lathe, the decision and final purchase would probably be in the hands of the superintendent of that department, subject to review at a higher executive level.

It is the latter type of purchase by the Air Force that we are concerned with here—the sale of one or a few units to a particular base, not a contract for 10,000 water coolers, say.

Whom To Contact

So the would-be seller (whether he be a small contractor or manufacturer's representative), who's interested in these smaller jobs must get acquainted with the Air Force at the "base" level. He would probably do well to get in touch with personnel at the "Major Command" level, too.

The Major Commands, it was pointed out at the technical conference, can also give information as to what the bases might need, and even more important, whom to see at the base.

Here is a list of the Air Force Major Commands with headquarters within the continental United States, and their addresses:

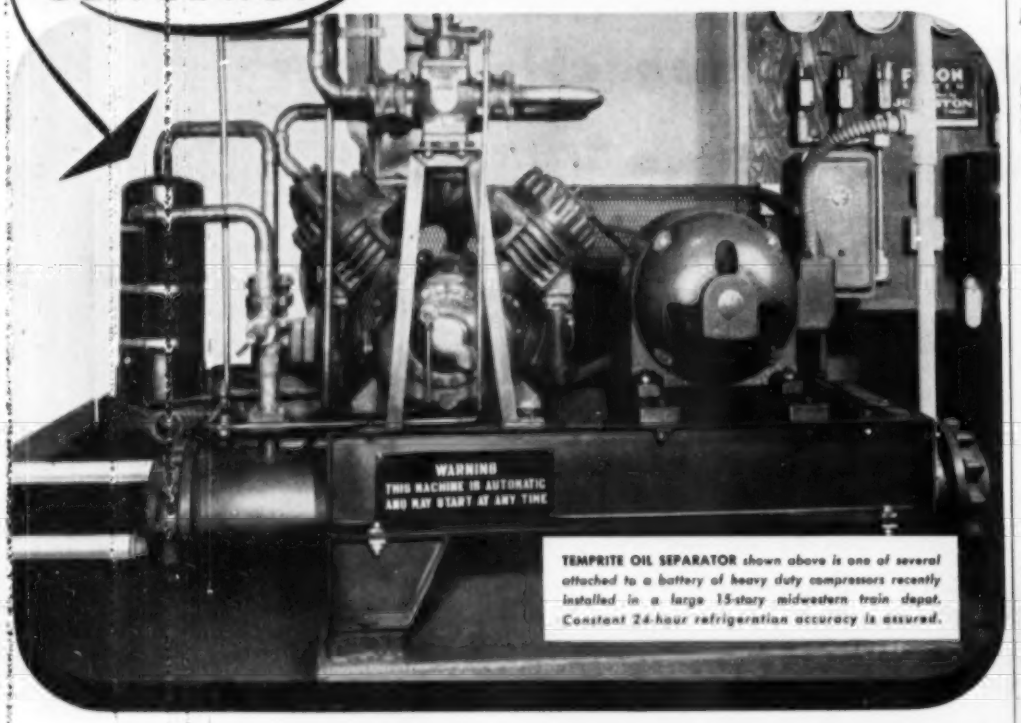
(Continued on next page)

MISSING SOMETHING?

More and better useful information is yours for the asking. See "What's New" page.

Use Key No. for fastest service.

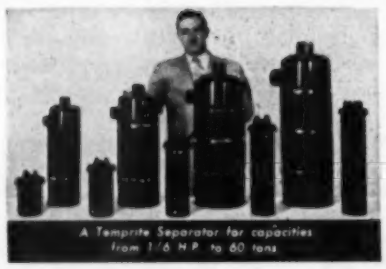
TEMPRITE SEPARATOR CUTS SERVICE CALL-BACKS!



TEMPRITE OIL SEPARATOR *shown above is one of several attached to a battery of heavy duty compressors recently installed in a large 15-story midwestern train depot. Constant 24-hour refrigeration accuracy is assured.*

DID YOU KNOW that you can practically eliminate service call-backs on refrigeration installations with the simple attachment of a Temprite Oil Separator to the compressor?

This is your best insurance against loss of cooling efficiency . . . because the Temprite Separator keeps the compressor oil out of the condenser and evaporator walls. If the cooling job is BIG . . . or small . . . protect yourself and your customer. *Install a Temprite Separator!*



A Temprite Separator for capacities from 1/6 H.P. to 60 tons

Since 1929 Temprite PRODUCTS CORPORATION BIRMINGHAM, MICHIGAN

TEMPRITE PRODUCTS CORP.
P.O. Box 72-A, East Maple Rd.
Birmingham, Michigan
☐ Send name of your local distributor.
☐ Send me complete data on your oil separators
Name
Address Zone
City State

"JOB TAILORED" means money saved

• Your cold plate dollar goes further when you specify DEAN because you eliminate waste! You get a plate in the *exact* size you need . . . not one that is almost right, but a plate that accurately meets your specifications. You name the size—you name the shape . . . we make it!

You can have plates in zinc metalized steel, stainless steel and in other metals. You can get cylinders, U's, angles, tanks, etc., and also plates for baudelot-type coolers.

Using DEAN "job tailored" cold plates means dollars in your pocket on every job. Try them!

SEND FOR TECHNICAL DATA BOOK

Get the details on DEAN Cold Plates for ice cream cabinets, locker plants, soda fountains, farm milk coolers, farm freeze cabinets, low temperature test rooms, frosted food refrigerators, window displays, food counters, refrigerated transportation and subzero applications for industrial chilling.

DEAN PRODUCTS, INCORPORATED
1042 DEAN ST., BROOKLYN 16, N. Y.
STerling 9-5400

AIR COOLED from 3/4 to 100 H.P. !
UNICON by KRAMER
REMOTE TYPE AIR COOLED CONDENSER

'Servicemen' Usually Can Do Business

(Continued from preceding page)

Strategic Air Command
Offutt Air Force Base
Omaha, Neb.

Air Materiel Command
Wright-Patterson Air Force Base
Dayton, Ohio.

Continental Air Command
Mitchell Air Force Base
New York, N. Y.

Air Defense Command
Ent Air Force Base
Colorado Springs, Colo.

Tactical Air Command
Langley Air Force Base
Virginia.

Air Training Command
Scott Air Force Base
Illinois.

Air Proving Ground
Eglin Air Force Base
Florida.

Air University
Maxwell Air Force Base
Montgomery, Ala.

Headquarters Command, USAF
Bolling Air Force Base
Washington 25, D. C.

Military Air Transport Service
Andrews Air Force Base
Washington 25, D. C.

Air Research and Development Command
P. O. Box 1395
Baltimore, Md.

Special Weapons Command
Kirtland Air Force Base
Albuquerque, N. M.

If a contractor or representative desires to approach one of these Major Commands, say the Air Proving Ground, by letter instead of in person, the letter should be addressed as follows:

Commanding General
Air Proving Ground
Attn.: Director of Installations
Eglin Air Force Base
Florida.

Note that it's the "Director of Installations" who is to be contacted at the Major Command level. At the individual base, the man to see is the "Air Installations Officer," who is the "chief engineer."

May Start with Civilian

Industry people may find it surprising, too, that they'll perhaps spend quite a bit of time talking to a civilian employe of the Air Force, but all the letters they receive will be signed by an Air Force officer, with whom they may or may not be acquainted.

You must remember that the Air Force is a *military* organization even though it has thousands of civilian employes. Every letter having to do with official Air Force business, therefore, must be signed by an officer.

Another surprise may be in store for the contractor after he has "sold" the Air Installation Officer and his civilian counterpart on an installation or piece of equipment. At this point a Purchasing and Contracting office at the base comes into the picture.

Purchasing Agent Setup

Actually, his function is identical with that of the purchasing agent at a manufacturing plant. In civilian life the salesman discusses his product or service with the chief engineer of the plant, say, who decides whether the product should be used by the plant. After the "chief" decides he wants to use this product, the actual purchasing is done by the company's purchasing agent.

That's the function of the P & C officer at an Air Force base.

The foregoing is admittedly the merest outline of how a contractor can make the contacts that might lead to a sale of refrigeration or air conditioning equipment to an Air Force base. He'll have to do a lot of exploring for himself, but that applies to any type of sale made anywhere.

Here's a practical tip, however, that might come in useful. At some Air Force base "salesmen" might have difficulty getting in touch with the man they want to see. "Servicemen" generally get through with no trouble.

(To Be Continued)

Room Conditioners Permit Hatchery To Control Production

Eggs Held In A-1 Condition Until Ready for Incubator

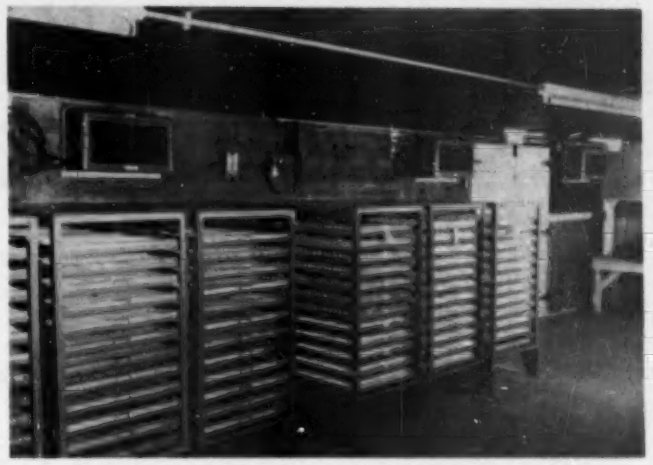
CHICAGO—Increasing use of room air conditioners to improve egg and chicken production was reported recently by Mitchell Mfg. Co.

With proper temperature control, the company said, one man can raise as many as 100,000 chickens in one year without investing heavily in expensive incubator equipment. By holding newly-laid eggs at a temperature of 55° F. and about 80% relative humidity, they can be held until a busy incubator is ready to start the hatching process.

According to reports to Mitchell by hatchery operators using its air conditioners, hatchability of the eggs is raised between 10 and 20%.

"After hatching, carefully balanced climate conditions controlled by air conditioners provide a healthy, rapid growth, allowing chickens to be killed and processed after only 12 weeks," it was stated.

"High quality of infertile eggs for eating purposes is also assured by proper temperature control. By removing the animal heat immediately after laying, and holding the egg at a constant temperature of 55°, the original 'fresh laid' quality is maintained until it reaches the consumer. This also assures top price for the poultryman."

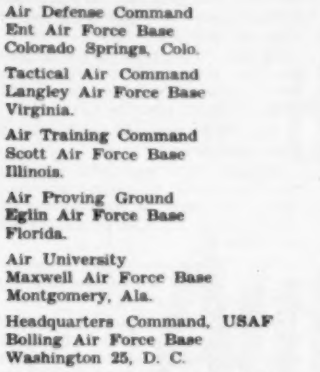


Through-the-wall installation at Sales & Burke hatchery, Riverside, Calif.

Cited was an installation at Sales & Burke hatchery in Riverside, Calif.

A bank of Mitchell window-type air conditioners in "through-the-wall" installations keep the storage space at the ideal temperature for both consumption and hatching. The thermostatically controlled units are mounted directly over large egg racks in a special insulated room assuring a constant temperature and climate control.

The installation was made by D. L. Kissell Refrigeration Co. of Inglewood, Calif., which specializes in this type of work.



RUDY
CONDENSERS

Fan or gravity types . . . fin and tube brazed . . . plate type crimped . . . clean . . . tight . . . standard or special to fit your needs exactly.

WRITE FOR DETAILS

RUDY Manufacturing Co.
Specialists in Manufacturing Evaporators and Condensers
DOWAGIAC, MICHIGAN

PICTURE OF A WELL EQUIPPED SERVICE ENGINEER'S TOOL BOX

402-2—up to ½ ton Freon-12 or 1 ton Methyl Chloride.
402-4—up to 1 ton Freon-12 or 2 tons Methyl Chloride.

When you are called to service a refrigerated display case, a blower coil, a milk cooler or a deep freezer—always carry an ALCO 402 with you. Chances are you'll find an old tired valve in need of replacement. The 402 is built for such a wide range of applications that it will fit any equipment with a capacity up to 1 ton F-12 and 2 tons Methyl Chloride.

Built with a minimum of parts, the 402 is sensitive and speedy in response to changes in suction gas temperatures. Liquid charge permits installation in any position in any location. Pressure limiting for motor protection. Wide superheat adjustment.

The space-saving ALCO 402 is built to simplify valve replacement problems for service engineers.

SEE YOUR ALCO WHOLESALER

ALCO VALVE CO.
853 KINGSLAND AVE. • ST. LOUIS 5, MO

Designers and Manufacturers of Thermostatic Expansion Valves; Evaporator Pressure Regulators; Solenoid Valves; Float Valves; Float Switches.

5093

Stainless Steel Shortage Still Slows Dairy Equipment Makers; Buying Lull May End

ATLANTA—There are indications that the current lull in purchasing of dairy equipment will not last much longer, according to C. E. Glasser, a member of the board of directors of the Dairy Industries Supply Association and treasurer of The Diversey Corp., Chicago.

Glasser made the statement in a talk delivered during the special short course on ice cream sponsored by the Dairy Department of the University of Georgia in cooperation with the Engineering Extension Div. of the Georgia Institute of Technology.

He pointed out that purchases have been running "far behind what we know to be the depreciation rate" of dairy equipment. But recently, he said, this trend has temporarily reversed itself.

"Suppliers of equipment and supplies," he reported, "feel that the present lull is only temporary and that the demand for the last part of 1952 will increase to a high level, when compared to available supplies. The full impact of both the defense program and replacement program of equipment and warehouse stock by dairy processors will be felt then."

As for the present, Glasser stated, "we know, roughly, that while we will not get all the materials we need to maintain our production at anywhere near pre-Korea levels, there will, for the next few months at any rate, be enough materials to build enough equipment to prevent any major breakdowns."

However, he noted that in general, "dairy equipment manufacturers have been receiving not quite 50% of the stainless steel which they have asked for, and this percentage, it appears, will decrease rather than increase in the months ahead. . . .

"The kind of stainless steel used by the dairy equipment manufacturer —18-8—nickel stainless—will, I think it safe to say, remain under strict controls as long as we have controls."

Ft. Warren Air Base Adds Four Walk-Ins for Meats

CHEYENNE, Wyo.—Building No. 253 at the Fort Warren Air Base is being remodeled to provide additional cold storage space, and the remodeling will include the replacing of old wooden floors with concrete, and the installation of four 10-ft. by 28-ft., prefabricated walk-in type coolers. The big freezers will maintain a temperature of 10° F.

Remodeling of the building and the installation of new refrigerators was necessary to provide adequate cold storage space for storing necessary meat products for increased troop feeding.

The building formerly was used as a storage warehouse for fruits, vegetables, and perishable items.

Wholesalers Vie To Sell At Least One 'Oil Sentry' a Day In Contest

BOSTON—Sale of a Mack "Oil Sentry" every day is the objective of a contest being sponsored by A. E. Borden Co. here, exclusive national distributor of the refrigeration compressor oil pump.

The "Mack-a-Day" contest is open to all refrigeration wholesaler salesmen and countermen. Those who sell 30 units in a 30-day period are entitled to prizes ranging from Parker pens to a complete camera outfit or home or portable radios.

Some of those who have sold one, two, or three units have received incentive prizes of Eversharp pens. Recent winners of these prizes are Arthur Becker, Milwaukee; Farrell E. Winn of Pacific Metals Co., Los Angeles; Sid Welch of U. S. Electric Co., Springfield, Ill.; Robert Conway; Los Angeles; and Louis Ricciardi of Tesco Distributors, Patterson, N. J.

Free Ride to Store Offered as Opening Day Traffic Builder

SEATTLE—In a bid to draw all traffic possible to the opening of its new Fifth Ave. appliance outlet, Danskin's offered local residents free transportation to the store by taxi.

"Ride in luxury right to Danskin's door," said an advertisement announcing the firm's open house. "Just call a Farwest cab from anywhere within the city limits and ride free."

Located between Pike and Pine streets, the store handles a wide variety of household items.

INSIDE DOPE

by GEORGE F. TAUBENECK

(Concluded from Page 1, Column 1)

Then, he abruptly told me:

"You Englishmen . . ."

"Excuse me, but I am not an Englishman."

"What the Hell are you?"

"Merely an average Frenchman."

"Oh, he said, surprised, "you speak such funny English that I thought you were an Englishman."

Another oriental joke:

"How much will you give me for my wife?"

"Nothing at all."

"It's a deal. Take her away."

ANDRE DELALANDE.

Copenhagen, Denmark

Editor:

The reading of your books have made me a great admirer. I do not think it possible that any other books on merchandising could contain so much value.

How thoroughly you know all ins and outs of managing and selling!

And then, Mr. Taubeneck, when I read the NEWS and look through the advertisements of big American manufacturers, I am delighted to see that they advocate the open display counter—as we do in Denmark.

The great majority of Danes feel we are all in the same boat with the U. S. We look on you as our great brother.

H. C. ANDERSEN.

Curtis Commercial Refrigeration
and Air Conditioning
Litchfield, Ill.

Editor:

Enclosed is an article from *Sunshine Magazine*, published by the Sunshine Press, Litchfield, Ill. Thought you would like it.

Son: "Daddy, what does that mean, progressive income tax?"

Father: "Well, Danny boy, that means that people who make more money pay a higher rate of taxes."

Son: "What do you mean?"

Father: "I mean that if you earned $1.00 a week running errands, you would be taxed 25 cents; that another boy who earned $3.00 a week would be taxed $1.00; and that some other boy who earned only 50 cents wouldn't be taxed at all."

Son: "Isn't that kind of crazy?"

Father: "Yes, I think so, but a lot of people don't seem to think so."

Son: "Why wouldn't all the boys pay the same rate? The boy that gets *twice as much* should pay *twice as much*, shouldn't he? And shouldn't the boy who gets half as much pay half as much? And why should somebody not pay anything?

Father: "That is much too sensible for the politicians in Washington. They think about votes more than they do about what is fair."

Son: "Who dreamed up this dopey idea, anyway?"

Father: "The man who was the first Communist. His name was Karl Marx. He hated successful people, and this was his idea of how to get rid of them."

Son: "But America isn't Communist. Why should Americans do what Communists believe in?"

Father: "Well, I guess you would say it was because the politicians want the votes of the boys who earn only 50 cents. There are so many more boys that earn 50 cents, they can safely pick on the boys who earn more."

Son: "That's kind of smart, isn't it? But why don't they make the people who earn more pay more for ice cream cones and street car rides and things?"

Father: "That makes a lot of sense. You'd think that is what they would do. But after they get through paying their taxes, they possibly can't afford to pay more."

Son: "But Daddy, why would anybody want to earn more if they couldn't keep it? It's hard work to earn money."

Father: "This is one thing the Communists count on. They hope that the people who might be able to earn a lot of money will stop trying. Then they could have things their own way."

Son: "Do you think they'll stop trying?"

Father: "That, son, is one of the biggest questions in the history of the world. Nobody has the answer."

O. W. VINCENT.

ANSUL WHOLESALERS are ready and equipped to render an intelligent, cooperative service to refrigeration service engineers on problems which arise, from time-to-time, in the operation of refrigerating systems.

Ansul has greatly increased its Research facilities — expanded its Research Program — and added new modern Pilot Plant facilities to better serve the Refrigeration Industry.

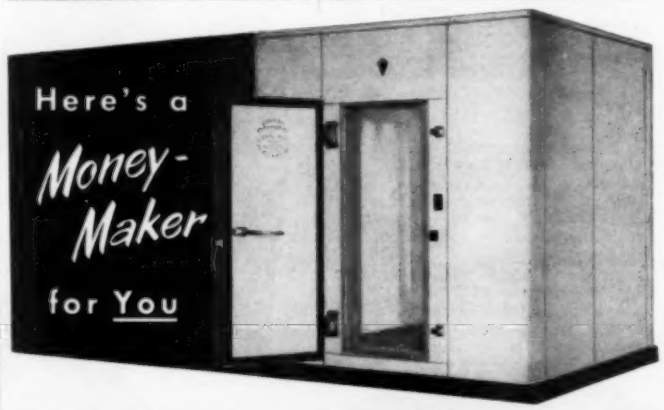
. . . and maintained by [illegible] control of every step in the manufacture of Ansul Sulfur Dioxide and Ansul Methyl Chloride.

Every cylinder of Ansul refrigerants is individually analyzed and carefully inspected to safeguard the rigid standards of purity and dryness and to insure maximum safety in handling.

For more than a *third of a century*, Ansul has both pioneered and led the field in the production of sulfur dioxide for refrigeration purposes. . . . Ansul methyl chloride has gained universal recognition in the industry for its unsurpassed quality.

ANSUL
CHEMICAL COMPANY
REFRIGERATION DIVISION
MARINETTE, WISCONSIN

ANSUL SULFUR DIOXIDE • ANSUL METHYL CHLORIDE
ANSUL OIL • KINETIC "FREON" REFRIGERANTS • ALSO MANUFACTURERS OF INDUSTRIAL CHEMICALS • DRY CHEMICAL FIRE EXTINGUISHERS



The New VIKING FF-88
Walk-In Cooler

Help your customers to profits and you help yourself to more sales. The new Viking FF-88 offers a way for your customers to increase income from frozen food departments—let them take advantage of lower-cost quantity buying . . . provides the low-temp refrigerated storage space they need to always keep on hand the right items for *their* customers.

Sell the complete line of Viking commercial refrigerators. See for yourself . . . while Viking franchises are still available in a few select territories.

To Get the Facts about a Viking Franchise
Mail Coupon Today
SINCE 1904
QUALITY LEADERS
VIKING REFRIGERATORS, INC.
7500 Wilson Ave., Kansas City, Missouri
☐ Tell me about the availability of a Viking Franchise in my territory.
☐ Send me free literature about the FF-88 and other Viking money-makers.
Name
Firm
Address
City Zone State
VIKING REFRIGERATORS, INC.
7500 Wilson Ave., Kansas City 3, Mo.

No other washer in the world is like the FRIGIDAIRE Automatic Washer!

...no wonder Frigidaire Dealers are beaming!

Public demand has been tremendous—

and it's gaining momentum every month. In the short time the Frigidaire Washer has been on the market, it has become one of the top brands in popularity and sales. Hundreds of thousands of satisfied users are enthusiastically telling friends and neighbors of the marvelous results they're getting — cleaner, brighter, trouble-free washes—with the sensational Frigidaire Automatic Washer!

Frigidaire features are winning sales!

Live-Water Action—gets clothes really clean, gently, thoroughly!

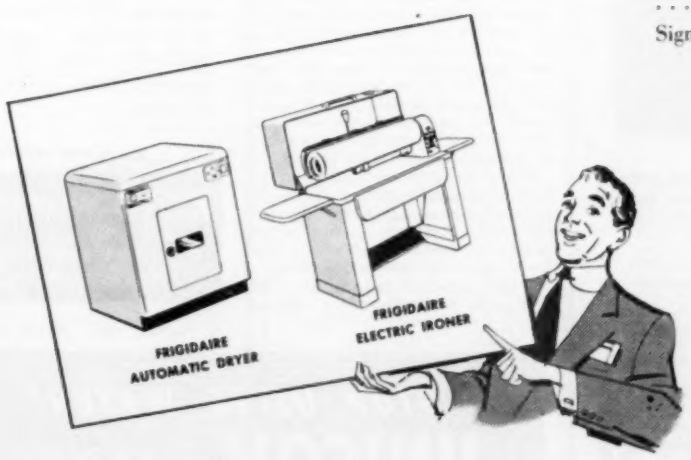
Rapidry-Spin—gets clothes drier, lighter to lift—in minutes!

Select-O-Dial—single, easy-to-use control makes washing completely automatic!

Convenient Top Loading—puts an end to backbreaking stooping and bending!

Lifetime Porcelain Finish—inside and out. No other automatic washer has it!

Vibration-Free—means no bolting down, easy installation, smooth, steady operation! . . . plus Frigidaire Pulsator, Underwater Suds Distributor, Unimatic Mechanism, New Signal-Light, Wash Water Switch, and many others.



. . . and the Washer is only one reason why Frigidaire Dealers consider their franchise to be so valuable!

Every Washer sale Frigidaire Dealers make furnishes them with live prospects for the Frigidaire Automatic Clothes Dryer and the Electric Ironer. Furthermore, regardless of what Frigidaire product they sell, they know they're backed by a sales organization second to none in the advertising, promotional, merchandising and sales training support it gives its dealers.

Ever Think of Selling a Room Cooler To Preserve a Rare Violin, Pamper a Prize Pup?

DETROIT—Those air conditioning dealers who think of the room cooler market as confined to doctors' and lawyers' offices and milady's bedchamber may be overlooking some good customers in spots that may not be so easily recognized.

As a stimulus to hunting out new prospects, here are a few examples of unusual places that enterprising dealers have installed room units, mostly of the window-mounted type:

A 1-hp. unit is installed in a special test chamber in the chemical laboratory of an oil company in Abbeville, La. Along with two humidifiers, it helps to maintain proper conditions for the analysis of gases and liquids.

A 3-hp. unit, with compressor located in the basement, is mounted behind an over-entrance sign in a small lunch counter located in Madison, Wis.

A 1-ton unit is installed in an operating room of a small hospital in Detroit. Controls, relays, and capacitors have been removed from the cabinet and mounted separately on the wall above the 5-ft. level in order to comply with city safety requirements.

A window-type room cooler is mounted in a truck van used as a mobile X-ray darkroom. The truck tours oil and gas fields making X-ray studies of pipes.

The paint sample room in a Crowley, La. paint store is fitted with a ½-ton window unit mounted through a wall opening.

The Larry Candy Co. in Danville, Ky. uses a 1-ton window unit to keep its candy from spoiling and to improve employe efficiency.

A violinist in San Juan, Puerto Rico uses a ½-ton window unit to preserve his rare violins and music albums from moisture damage.

A Del Rio, Texas restaurant, unable to use a cooling tower, installed five 1-ton window units instead of a single store conditioner and gained greater flexibility of operation.

A tiny, hole-in-the-wall type jewelry store in Philadelphia found the only way it could get air conditioning was to put a 1-ton unit in the transom over the doorway.

A window-type room air conditioner is providing cooling in a kennel for prize Pomeranians in Fredericksburg, Va.

The "cry room" in an Ashland City, Tenn. theater, where mothers with bawling babies can watch the movie without disturbing other patrons, is kept cool and comfortable by a 1-ton window-type air conditioner.

A small shoe store stuck in the end of a dead-end alley in Baton Rouge, La. is cooled by a 1-ton room cooler with the condensing unit located in the skylight.

Hajoca Distributes UsAirco in 9 States

—MINNEAPOLIS — Another major step in the expansion of marketing facilities for its window-type room air conditioners was announced by United States Air Conditioning Corp., which reported that the units will be distributed by Hajoca Corp. in nine middle Atlantic and southern states.

The Hajoca organization, one of the country's largest in the plumbing, heating, and refrigeration supply field, operates 33 branches in New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, Tennessee, Georgia, and Florida. UsAirco self-contained store-type conditioners will also be distributed by Hajoca through those of its branches which maintain refrigeration departments.

Sales of UsAirco equipment will be under the direction of R. B. Davis, manager of the refrigeration supply division of Hajoca.

1-HP. CONSOLE UNIT is installed in closet of Lyndale housing project, Camden, S. C. Panel divides closet so that unit furnishes cooling for two bedrooms. Lower grille is for air intake.

Multiple Room Cooler Sales

110 Window Units Help Night Shift Workers Sleep During the Day; Housing Project Uses Consoles

AUBURN, N. Y.—Two examples of what he claims to be the trend to multiple sales of room air conditioners were cited recently by E. A. Bonneville, general sales manager of the Remington Air Conditioning Div., Remington Corp. here.

One example was the purchase of 110 Remington window units by the Bell Aircraft Co. for its night shift employes at its Ft. Worth, Texas plant. Efficiency of these people was lowered, the company found, because they had to sleep during the daytime in hot bedrooms and with the noise of children coming in the necessarily open windows.

To help solve this problem, the company purchased this large quantity of coolers from Remington and offered them to night shift employes on "a most favorable" basis. The company believes that with the coolers to aid sleep, the output and quality of work by the night shift will be tremendously improved.

The other example was the installation of 1-hp. Remington console units in every home of the low-cost Lyndale housing project for textile and chemical workers at Camden, S. C.

This installation was on the unusual side, Remington points out, because the standard 1-hp. console is installed so that it supplies conditioned air to two bedrooms. The standard mahogany wood cabinet was removed from the unit and the air conditioner placed in an airtight closet only slightly larger than the unit itself. The conditioner is mounted on casters so that it can be rolled out of the closet for service, when necessary.

A baffle is placed in the closet parallel to the floor and directly below the outlet air louvers of the unit. A return air chamber is in the lower half.

In the wall of each room near the ceiling an adjustable grille was placed to allow the conditioned air to circulate into each bedroom. This air was completely cooled, filtered, and dehumidified by the unit. Another grille in the wall just above the baseboard in each bedroom provides the path for the circulated room air to return to the chamber to furnish the unit's air supply.

These installations have proved most economical both from the standpoint of original and operating costs, Bonneville said. The lowest priced console in the Remington line was used and since one unit is doing a job that it would require two window units to perform, the over-all costs are kept to a minimum.

The unit is completely out of sight and yet readily accessible for service.

The air-cooled consoles used in this installation provide 10,600 B.t.u. per hour under the ASRE ratings with a maximum cooling power of 11,600 B.t.u. per hour; 400 c.f.m. of conditioned air is supplied. The electrical heating elements supply 7,000 B.t.u. per hour.

The "Climate Compensator" humidity control increases air drying for ultra-humid seasons and increases air cooling for hot, dry periods.

Bonneville said that similar installations to this Lyndale housing project are being planned by a number of owners with the assistance of Remington's application engineers. The latest are a number of units at Sea Cove Cottages, Vero Beach, Fla.

The console unit can provide heating as well as cooling from the same unit and both may be automatically controlled by a thermostat, an optional feature.

to stop traffic
to clinch sales
and to peak
your '52 profits

THE ONLY ROOM AIR CONDITIONER GIVING YOU ALL THESE GREAT SALES ADVANTAGES

Weath'r-Dial The amazing new Weath'r-Dial is an engineering miracle that has made MITCHELL the only revolutionary, new product in air conditioning on the market today!

The Weath'r-Dial is a *single control knob* that *automatically adjusts* to five individual levels of cooling, dehumidifying, ventilation and exhaust.

only MITCHELL has the Arid-Dryer for extra dehumidification control.

only MITCHELL has the Four-Direction Air Grills allowing air delivery tailored to every installation.

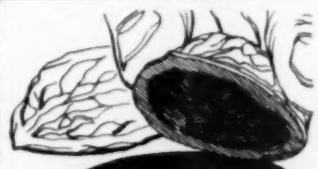
only MITCHELL has the Sound Muffler permitting the lowest operating sound level of any unit on the market.

only MITCHELL is so easily installed . . . and has such an enviable record of trouble free service.

MITCHELL "THE WORLD'S FINEST ROOM AIR CONDITIONER"
SEVEN MODELS TO CHOOSE FROM—FOUR DIFFERENT CAPACITIES

MAIL THIS COUPON TODAY FOR FULL DETAILS

MITCHELL MFG. CO., DEPT. AC-8
2525 Clybourn Ave., Chicago 14, Ill.
Gentlemen:
Yes, I am interested in a MITCHELL Room Air Conditioning Dealer Franchise. Rush me complete details today.
Name
Address
City Zone State



don't gamble...
RUDY
mild steel
EVAPORATORS
fit your needs exactly

Famous brazed mild steel tube-on-sheet type... galvanized... super finished... prompt service... low cost... all types.

WRITE FOR DETAILS

RUDY Manufacturing Co.
Specialists in Manufacturing Evaporators and Condensers
DOWAGIAC, MICHIGAN

STOP USING WATER!
UNICON by KRAMER
REMOTE TYPE AIR COOLED CONDENSER

'Package' Store Units Handle 'Impossible' Locations for Comfort Cooling

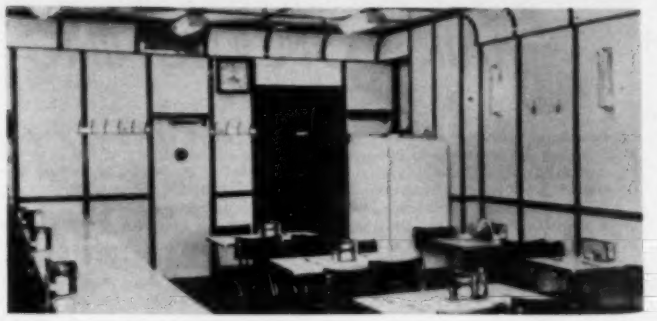


PHOTO SHOWS how Typhoon unit was recessed in porcelain wall. Kitchen doors are to left. Controls are reached from kitchen. Even patrons near conditioner are not affected by noise.

No Basement Space, No Floor Room, Flat Roof Problem Solved by Recessed Unit

NEW YORK CITY—Peter Caravas, owner of Regen's restaurant in the Bronx, estimates that air conditioning has increased his business well over 50% during the summer months, in the two years since he installed a packaged Typhoon unit.

"July and August used to be my worst months," he says, "and now they are unquestionably my best. Before this unit was installed, 70% of the meals served here during the summer were salads and other cold dishes. Now 80% of my summer business is in the hot, higher priced dishes."

Regen's is a small restaurant right next to a subway station. Business is steady all day.

Caravas was not sure at first that he could air condition the place at all. The restaurant is on the ground floor, directly under a flat roof, and besides this high solar heat load, there is the naturally high latent heat load found in any restaurant where steam tables, coffee urns, and similar fixtures add to the humidity. An additional problem was that he had no basement space to install air conditioning, and could not spare floor space for a packaged unit.

For a solution, Caravas appealed to a local air conditioning contractor, Frozen Air Maintenance & Supply Co., headed by Nat J. Meister. Alfred Guttag, engineer for the firm, surveyed the restaurant and found a corner in the kitchen where a small packaged unit could be recessed with its front panel and discharge grille set in the wall of the conditioned space. The heat load came out to 7½ tons, and a cooling tower was recommended.

The Typhoon model 81 SC installed for this job takes up only 4.64 sq. ft. of floor area in the kitchen, and has a high latent heat capacity, which makes it ideal for restaurants and other places where humidity is excessive. Efficient heat transfer is accomplished by a deep (7-row) coil.

After two summers of use, Caravas is completely satisfied with his air conditioning. "I see the advantages of air conditioning all around me," he declares. "For example, the place stays so much cleaner. Grease and smoke used to accumulate on these porcelain walls, and now most of it is trapped by the filters. We used to find dust and dirt on plates that had been set out only a few minutes—air conditioning allows us to set up for rush hour even earlier than before.

"Air conditioning also cuts down on the cost of my refrigeration," he adds. "I don't have to defrost my fruit cooler so often, and the Bain Marie and the freezer cycle much less often. Then there's the matter of summer tempers—I don't have half the aggravation from customers—or from my own employes—that I had before."

The kitchen at Regen's was a sore spot before air conditioning was installed. With no windows, kitchen employes had to suffer the already hot air from the restaurant, drawn in by an exhaust fan in the rear of the window-less kitchen. Now the same fan draws in cool air, and the kitchen temperature is at least 15% cooler even in mid-summer.

Reinforced Concrete Walls, Time Element Dictate Package Coolers

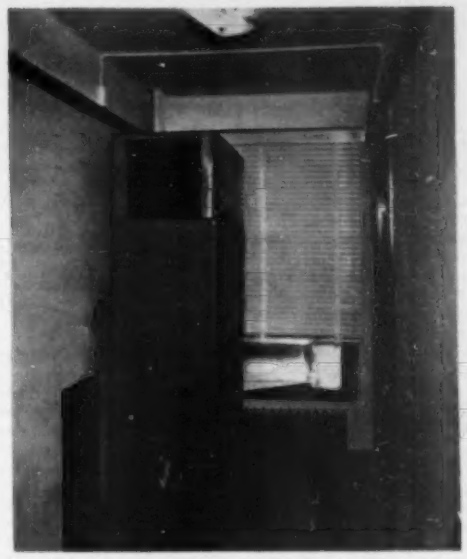
SACRAMENTO, Calif.—Ingenuity plus the flexibility of General Electric packaged store coolers provided the answer last year to problems posed in air conditioning the Hotel Senator here.

A nine-story reinforced concrete structure, the hotel is located directly across from the California State Capitol building and is a favorite stopping place with state legislators. Until the installation of air conditioning equipment, the two top floors of the hotel were virtually uninhabitable when summer temperatures reached torrid heights.

This revenue-losing situation continued until the hotel was transferred to new owners last year. The new management, viewing such an uneconomical situation with alarm, called for air conditioning—and quick. The speed requirement was problem No. 1.

The nature of the hotel's construction was problem No. 2. The reinforced concrete walls prevented economical installation of return air ducts for a central plant system.

This, coupled with the speed requirement, decided in favor of the self-contained packaged units and currently 20 G-E 5-ton conditioners provide comfortable, air conditioned atmosphere at the hotel.



ONE OF 20 G-E FD-50's installed in halls of Hotel Senator, Sacramento, Calif. Packaged unit cools air in hall which in turn is sucked into room through transom by exhaust system in room.

Ingenuity came into play in the installation. Located in the halls, the units take advantage of the fact that there are transoms over the doors and exhaust systems in each room. The cool air is distributed through the hall and sucked into each room by the exhausts.

C. D. Williams of General Air Conditioning and Heating Co., northern California G-E distributor, says installation of air conditioning has increased revenue by about 22%.

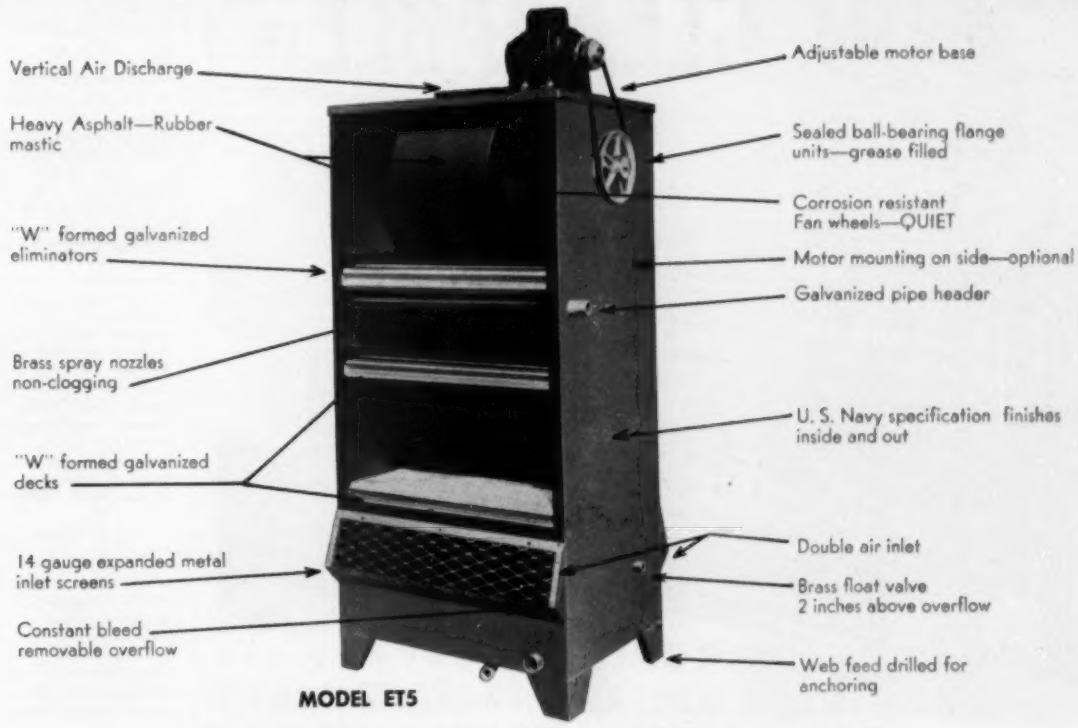
Don Williams of General Air Conditioning planned the project. Installation was by R. M. Carpenter.

TYPHOON
Air Conditioning
ENGINEERED FOR EVERY NEED
•
PRICED FOR EVERY BUDGET

- Air Conditioning Units 1½-20 tons
- Multi-Packaged Systems Up to 60 tons
- Prop-R-Temp Heat Pumps 2-20 tons
- Evaporative Condensers
- Packaged Water Chillers

TYPHOON AIR CONDITIONING CO., Inc.
794 Union Street, Brooklyn 15, N. Y.

Good-Fellow
ECONOMY SERIES COOLING TOWERS


Vertical Air Discharge
Heavy Asphalt—Rubber mastic
"W" formed galvanized eliminators
Brass spray nozzles non-clogging
"W" formed galvanized decks
14 gauge expanded metal inlet screens
Constant bleed removable overflow
Adjustable motor base
Sealed ball-bearing flange units—grease filled
Corrosion resistant Fan wheels—QUIET
Motor mounting on side—optional
Galvanized pipe header
U. S. Navy specification finishes inside and out
Double air inlet
Brass float valve 2 inches above overflow
Web feed drilled for anchoring

MODEL ET5

Here, in the GOOD-FELLOW, ET series, you will find every requirement met for a compact, highly efficient, economical cooling tower in capacities of 11 tons or less. For either indoor or outdoor installations. Most economically priced.

REPRESENTATIVES IN THE FOLLOWING CITIES

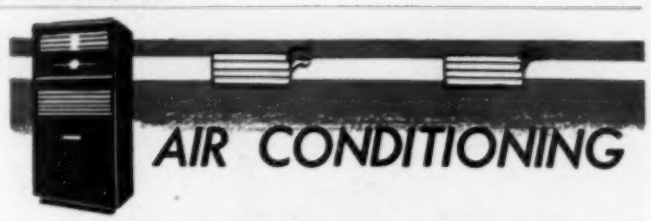
Atlanta, Ga.	C. T. Pottinger	Nashville, Tenn.	John L. Craig
Baltimore, Md.	Dexter Company	Newport News, Va.	Noland Co., Inc.
Columbia, S. C.	Noland Co., Inc.	Philadelphia, Pa.	John F. Scanlan
Columbus, Ohio	Mason Supply Co.	Raleigh, N. C.	Noland Co., Inc.
Detroit, Mich.	Emanuel Feinberg & Associates	San Francisco, Calif.	Regional Sales Co.
Fort Wayne, Ind.	C. D. Farrington	Savannah, Ga.	Savannah Refrigeration Supply Co.
Fort Worth, Texas	J. D. Higgins Company	Tampa, Fla.	O. H. Howell Manufacturers' Representative
Kansas City, Mo.	O. K. McCullough Co.		
Knoxville, Tenn.	Tennessee Heating Sales Co.	Wakefield, Mass.	E. A. Seeley, Inc.
Miami, Fla.	Quigley Corp.	Washington, D. C.	Randall S. Stover

WRITE, WIRE OR PHONE FOR COMPLETE INFORMATION AND PRICES.

E. D. Goodfellow Co., Inc.
496 E. BODLEY AVE. • MEMPHIS, TENN.

Where Is Small City Market?

Lima, Ohio Dealer Uses List Compiled by Utility as Sales Tool To Show Prospects Where Similar Installations Were Made



LIMA, Ohio—A list of air conditioning installations in the business district of his town is one of the best selling tools a dealer can have, C. F. "Mike" Sweeney of Sweeney Engineering Co. here avers.

Sweeney has such a list prepared by the local utility. It is particularly valuable to Sweeney because his firm is company "A" which the list tells you has installed 1,150 tons of air conditioning as compared with a total of 451 tons for all of 12 competitors. His closest competitor, company "J," has sold only 68 tons of equipment.

How does he use the list?

"I can use it in two ways," says Sweeney, who is the local Carrier dealer and has been since 1934.

"When talking to a prospect, I just slap that list down on his desk and let him look it over. It not only impresses him with the work done by our firm, but also gives the name of each installation. The prospect is no doubt familiar with a good many of my customers.

"Another way I use it is to check on the installations made by competitors to see if the customer is satisfied or can use additional equipment. For example, I called on one candy store that was using competitive equipment. I found the store operator dissatisfied with the job being done with a 10-ton unit in the retail store. I moved this equipment back to cool the candy production area and installed a 5-ton Carrier unit in the retail store, much to the customer's satisfaction."

Range from 2 to 125 Tons

Installations listed range from a 2-ton unit in a barber shop to a 125-ton system in a theater. In between are a wide variety of stores (including a department store), offices, clubs, hotels, showrooms, and even a radio station studio.

Sweeney's sales organization is small, consisting of only one outside salesman, a sales engineer, and himself. But among them they cover a 12-county territory in western Ohio.

Sweeney himself started in business as an electrical contractor many years ago. From that he moved into selling electrical household appliances and from there into the commercial refrigeration and air conditioning field. He says he is the 12th dealer to sign up with Carrier Corp. and sold the first production units of some of their early refrigeration compressors and condensing units.

Illustrative of some of the larger types of air conditioning installations Sweeney makes are the Pangle Master Market here and the television tube plant of the Sylvania Electric Products Inc. in Ottawa, Ohio.

In the Pangle market, which, Sweeney says, handles up to 7,000 persons per day on a busy Friday or Saturday, he installed 40 tons of air conditioning together with duct-type gas heaters to provide year-round cooling and heating. To handle the load, the 100 by 200-ft. store is divided into four zones.

"For this installation, I built my own air handling unit, powering the entire system with a 40-ton Carrier compressor and evaporative condenser," Sweeney explained.

TV Tube Mfr. Gets 150 Tons

In the television tube manufacturing plant, he installed 150 tons of air conditioning in the tube cleaning room where temperatures of 70 to 75° F. and a relative humidity of 15% have to be maintained.

"The air in this room has to be absolutely clean," Sweeney declared. "Even a single speck of dust cannot be tolerated in the tubes.

"To accomplish this, we pass the air through a 4-in. dry filter, an automatic electrostatic filter, a spray type air washer, and then another set of dry filters. Even then they sometimes complain that dust gets through.

"The women that work in the tube cleaning room are required to change their clothes before entering so that they will not carry dust into the room with them," he added.

Though Sweeney is proud of the overwhelming acceptance he has built up for his products in his territory, he still says, "Maybe we could do a better job if we had competition!"

Sweeney recalled that one dress shop operator called in Sweeney's engineer to give her an estimate on the cost of air conditioning her establishment. When he presented the figures, she told him: "I'm going to buy the air conditioning, but I won't buy it from Sweeney. It is just because he has sold air conditioning to all the other shops that I have to buy it. So I'll be damned if I'll buy it from him."

"And she didn't either," Sweeney chuckled.

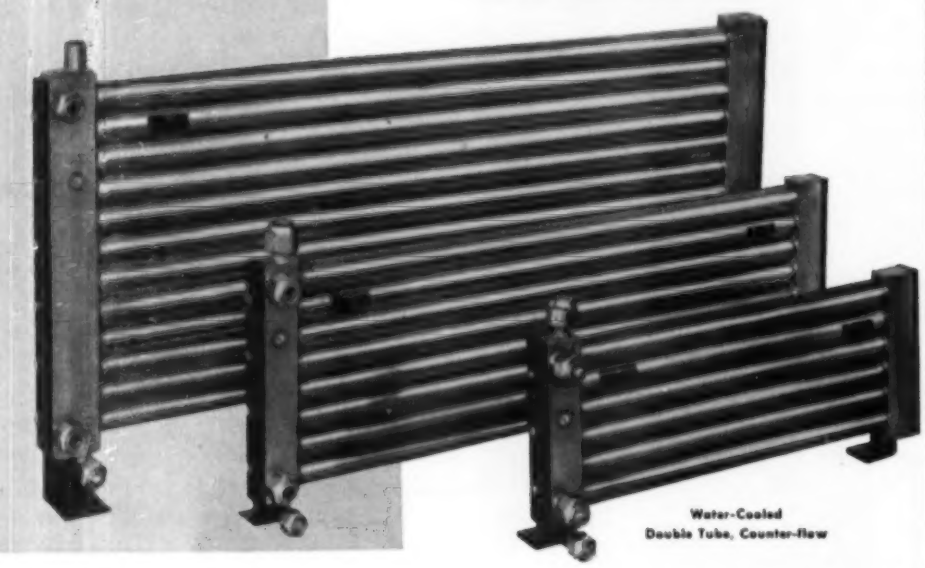
Where Installations Were Made In City of 50,000 Population

	TONS
COMPANY "A" (Sweeney Engineering Co.)	
Acme Photo Supply	8
Anchor Grill	10
Argonne Hotel	29
Ark of Sweets	4
Artley Apparel	15
Bailey-Moaning Barbers	2
B & O Restaurant	6
Colonial Finance Bldg.	45
Central States Seeds	6
Congress Cafe	15
Court Cafe	8
Crawford Shoes	13
Davidson Enamel Products	6
D.W.G. Cigar Corp.	15
B.P.O. Elks	50
Ed's Cigar Store	6
Feldman's, Inc.	60
First Lima Drugs	16
Goldman's	6
Gordon's Beauty Shop	5
R. T. Gregg, Inc.	108
Hart's Jewelry Store	35
Heimann's Furs	6
High Street Market	18
Holmes-Pontiac	8
Hunter Drive-In Drugs	12
Jack's Cafeteria	6
Kay's Jewelers	6
Kibler Clothes	8
Kirwan Grill	8
Leader Store	80
Lima-Hamilton Office	3
Lima Packing Co.	5
Madison's	10
Manhattan Cigar Store	15
McLaughlin-Keil Architects	4
Memorial Hospital	20
Naborhood Super Market	15
Neon Products, Inc.	28
North Star Woolen Mills	25
Ohio Oil	6
Ohio Theatre	125
Pangle's Master Market	40
Princess Beauty Shop	4
Ranger Theatre	40
Shawnee Country Club	10
Sigma Theatre	60
Sill's Shoes	10
Sportsman Grill	6
Stadium Restaurant	8
Standard Oil	33
Steven's Rug Co.	8
Superior Coach Corp.	15
Sweeney Engineering Co.	3
Thomas, Dr. L. C.	10
Van's Dress Shop	3
Walgreen Drug Store	15
W.I.M.A. Radio Studio	10
Total	1,151
COMPANY "B"	
Albers Market	15
Arthur's Restaurant	3
Continental Lounge	3
Hodosko Jewelers	3
Last Chance Cafe	3
Stone Grill	10
Tip-Top Sandwich Bar	5
W.L.O.K. Radio Station	3
Total	45
COMPANY "C"	
Bar B. Q.	5
First Federal Savings	5
Flammer's	5
Minnick's Chevrolet	5
Nat'l. Bank Trust Dept.	5
Nesbitt Candy Store	3
New Yorker	5
Roxy Grill	8
Susie Q	3
Vickie Frocks	5
White-Haines	5
Wonder Bar Cafe	5
Total	59
COMPANY "D"	
Ark of Sweets	10
Cantwell Funeral Home	5
Hudson Restaurant	15
Kirwan Basement	3
National Can Co.	3
National Finance	3
Numade Hosiery	2
Saum's Beauty Shop	5
Willsey-Hudson	3
Total	49
COMPANY "E"	
Brunswick Cigar Store	5
Coney Island Restaurant	3
Lord's	5
Luggage Shop	5
Nesbitt's Hamburger Shop	8
Ray's Cigar Store	3
Sarno Restaurant	5
Spyker's Sandwich Shop	5
Willard's	8
Total	47
COMPANY "F"	
City Loan	3
Metropolitan Bank	10
Total	13
COMPANY "G"	
City Loan	60
Total	60
COMPANY "H"	
City Loan	30
Total	30
COMPANY "J"	
Barr Hotel	10
Betty's Beauty Shop	3
Sarno Restaurant	15
Telephone Co.	15
Westinghouse	25
Total	68
COMPANY "K"	
Huddle Sandwich Shop	5
Sweetland	10
Total	15
COMPANY "L"	
Quilna Theatre	50
Total	50
COMPANY "M"	
Acme Photo Shop	5
L & L Grill	5
Whitney's	5
Total	15
COMPANY "B" thru "M" Total	451

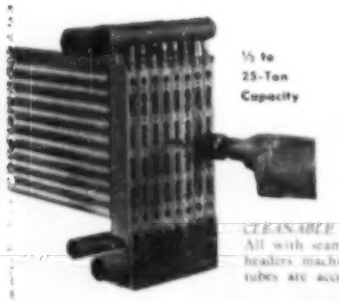
(This chart, compiled by the Lima utility, has proven to be a useful sales tool for C. F. Sweeney of Sweeney Engineering Co., which is company "A" in the list. Only installations in the Lima business section are listed. They indicate the market there is for air conditioning in an industrial town of approximately 50,000 population.)

No. 1 Requirement—in any size unit

an HM CLEANABLE CONDENSER



Water-Cooled
Double Tube, Counter-flow



½ to 25-Ton Capacity

Regardless of whose condensing unit you buy—and regardless of its size—your first "*must*" is to insist that it have a CLEANABLE (*water-cooled*) condenser to help you maintain new-unit efficiency indefinitely. When you realize that use of a simple spiral tool, doing a thorough mechanical cleaning job, can always restore copper-water surfaces to their original heat-exchange efficiencies, you won't settle for anything less than a cleanable condenser. And especially so now since most major manufacturers recognize the demand for "*Cleanable*", and are equipping their units accordingly. Remember too, you can now count on surprisingly low initial cost that is made possible by Halstead & Mitchell's tremendous high productive capacity.

CLEANABLE in all size capacities. All with seamless copper tubes, brass headers machined and brazed. Water tubes are accessible from either end.

HM Halstead & Mitchell

Wholesalers in Principal Cities—Write for descriptive literature

OFFICES: BESSEMER BUILDING • PITTSBURGH 22, PA.

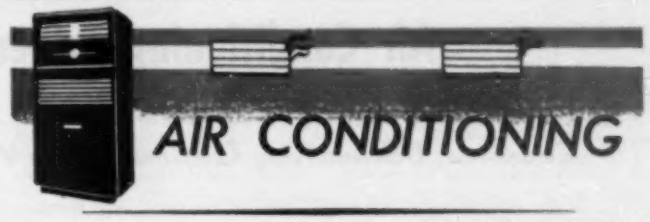
NO WATER FOR CONDENSING!

UNICON by KRAMER

REMOTE TYPE AIR COOLED CONDENSER

Humidity Control Simplified?

McFarlan Method 'Sub-Cools' Air To Get Proper Dewpoint, Then Reduces Volume Delivered to Room



WASHINGTON, D. C.—What is claimed to be a simplified method of achieving humidity control at partial loads in an air conditioning system was outlined for U. S. Air Force air conditioning engineers at a recent technical conference here by A. I. McFarlan of A. I. McFarlan Co., Inc., New York City.

Essentially, this method (it's been tested in several installations, McFarlan says) lowers the temperature of the air coming from the coil to a point below the desired dewpoint in order to extract enough moisture, but reduces the amount of this colder-than-normal air delivered to the room so that the room temperature doesn't fall below the desired point.

Humidity Control a 'Hot' Problem

"Humidity control is a mighty hot problem in the air conditioning industry," McFarlan declared. "Most of today's air conditioning installations are designed for inside temperatures of 80° F. and a relative humidity of 50% when the outside temperature is 95° F. with 40 to 55% relative humidity.

"But when outdoor temperatures are moderate while the humidity is high, the average air conditioning system may cause complaints. This condition occurs much more frequently in many places than does the design 95° temperature."

What happens, McFarlan reminded the group, is that the relative humidity within the conditioned space rises to "an uncomfortable, and in many cases, an unhealthy condition.

"Unless automatic controls are provided to prevent it, a high temperature of supply air will satisfy the reduced internal sensible load on the frequent high wet bulb, low dry bulb outside day. This means that in addition to the penalty from compressor shutdown, even with the compressor operating, less moisture is removed from the air due to the high dewpoint leaving the coils. Re-evaporation from a wet coil also adds to a bad situation when the compressor shuts down."

When an attempt is made to avoid this rise in humidity, the methods usually employed are reheat or by-pass. Both, he said, require a constant air volume.

Reheat Is Expensive

"Reheat costs money to create, and more money to remove it through the refrigerating system," he contends, adding that by-pass also has limitations: "It is completely ineffective for 100% fresh air and limited in value as the percentage of fresh air increases, especially for operation with high humidity fresh air.

"In a system which can properly handle the design temperature and humidity at full load, the problem occurs in a zone which is affected by the elimination of stn effect, reduced outside temperature, reduced inside sensible loads, or a combination of these causes with an increased humidity load from fresh air," McFarlan said.

"If we are designing a typical installation with north and west exposure, other things being equal, we would use a larger quantity of air in the west zone than in the north. If it were possible to reduce this quantity of air in the west zone to make a north-type zone when the sun did shine on the west zone, then part of our problem would be solved.

Coils Must Satisfy Thermostat

"Under this condition," he said, "the tendency to raise the dewpoint of the coils, due to less internal sensible load, is at least partially compensated by a reduced quantity of air which, in turn, requires a lower temperature leaving the coils to satisfy the thermostat.

"The reduced quantity of air, however, may fail to pick up enough internal latent heat to produce a satisfactory relative humidity, especially when the thermostat setting is reduced.

"This can be corrected within limits by taking the air off the coils at a lower temperature by producing a lower coil dewpoint. The lower coil temperature at partial load is possible because we then have excess compressor capacity.

"If we can reduce the dewpoint to a sufficiently low temperature, we can satisfy any reasonable humidity condition in any room or any zone. However, as we reduce the dewpoint to satisfy the humidity, we must necessarily further reduce the air quantity to prevent over-cooling."

According to McFarlan, this can be done by using an outlet or diffuser which will permit considerable variation in quantity of air delivered without shortening the throw of the air or permitting the low temperature air to create drafts.

6-Row Coil Can Control Dewpoint

"If we eliminate reheat and use at least a six-row coil, we can control the dewpoint from a dry bulb thermostat for all installations except where humidity must be very accurately controlled. Human comfort systems respond nicely and can be controlled from a dry bulb thermostat in the air stream leaving the cooling coils."

It is also possible, and in some cases advisable, to use a humidistat tied into a thermostat for more complete control of humidity, suggested McFarlan.

Use of such a system may also involve a static pressure regulator in some installations where the variation in air pressure between full and minimum loads may result in drafts, he said.

"The static pressure regulator would probably be necessary on big systems, but on small systems judgment will be required. If 85% of the load is at constant pressure, for example, you won't need a static pressure regulator, but if 85% of the load is variable, don't omit it," McFarlan suggested.

In his talk, the speaker briefly outlined three air conditioning installations using this design, including an office building, a laboratory, and an apartment house.

Incidentally, McFarlan says he has applied for patents on the design and method of control and hopes to see it used on a royalty basis.

It is claimed by McFarlan that the system costs no more than reheat and possibly less because it permits a considerable reduction in duct-work and possibly also in size of the compressor and air-handling equipment which offset the costs of volume control dampers, etc.

Packaged units could also adopt this principle, too, according to McFarlan, who suggests that "an ideal solution would be a type of grille now offered by Minneapolis-Honeywell for winter heating known as Type D500A. The addition of an electric motor to operate automatically this type of grille would solve the humidity problem at partial load for most comfort installations."

Such an application might require a static pressure regulator or a fan that maintains a more or less constant static pressure regardless of the air quantity used while the control would be accomplished by a modulating thermostat to reduce the amount of airflow as required.

Humidistat Can Reduce Air Quantity

"A humidistat used in series with a thermostat could reduce the air quantity when the thermostat is satisfied but the humidistat is not. Either, of course, would start the compressor if not satisfied.

"When the humidity became too high, the face area of the grille could be partially closed, thus reducing the c.f.m. handled and, in turn, reducing the outlet temperature leaving the coil. This will increase the humidity removal and cause the compressor to operate for a greater percentage of time."

ROTARY SEAL Replacement Units

AVAILABLE FOR MORE THAN 900 COMPRESSOR MODELS

The original precision-built replacements for Commercial, Semi-Commercial, Air Conditioning and Home Refrigerator Compressors.. Proven by outstanding performance for over 20 years! Units are available for all standard makes.

✔ Easy to Install
✔ Simple in Construction
✔ Efficient in Operation
✔ Economical

AT ALL LEADING JOBBERS

THE mechanical seals for ROTARY SEAL COMPANY rotating shafts

"Seal with Certainty!"

2020 NORTH LARRABEE STREET
CHICAGO 14, ILLINOIS, U.S.A.
CANADIAN AGENT: 2025 ADDINGTON AVENUE
MONTREAL 28, QUEBEC, CANADA

Success Story [OVER 20 YEARS ENGINEERING KNOW-HOW AND EXPERIENCE
OVER 18,000 SUCCESSFUL INSTALLATIONS FROM COAST TO COAST

The HEART of any Air Conditioning Unit is the COIL

ALL COPPER FINS AND TUBES
TUBES BOTH EXPANDED AND SOLDER BONDED TO FINS
TIN DIPPED HEADERS
EXPENSIVE SIL-FOS USED FOR SOLDERING
ALCO EXPANSION VALVE INCLUDED
DISTRIBUTOR HEAD METERS REFRIGERANT EXACTLY THROUGH ENTIRE COIL
⅝" OD TUBES IN STAGGERED ROW CONSTRUCTION
FLOOR MODELS 600 CFM TO 2,200 CFM
ZEPHYR 600 CFM
HASTINGS Air Conditioning Units feature Coils with 100% Copper Fins and Tubes
UTILITY MODELS 1,000 TO 3,000 CFM
CENTRAL PLANTS 4,000 TO 12,000 CFM

HASTINGS
AIR CONTROL . . . THE PROVEN ECONOMY LINE THAT BUILDS PROFITABLE YEAR-ROUND VOLUME

- All Direct Expansion Models are equipped with Alco Expansion Valves
- Water units with 6-row coils for use with city water at 60° or less; chilled or well water — from 600 to 12,000 CFM
- Each unit complete with motor, drive and filters
- No other coils have all the HASTINGS qualities which contribute to MAXIMUM EFFICIENCY and long life.

EASY SELECTION
Engineering design and capacity ratings permit quick and simple selection of equipment for the job.
COMBINATION cooling and heating units for steam or hot water.

GAS UNIT HEATERS
Complete line 75,000 to 200,000 BTU. AGA approved.

IMMEDIATE DELIVERY

INVESTIGATE NOW
We guarantee that you will find the line of HASTINGS COOLING, HEATING AND VENTILATING EQUIPMENT to be exceptional in performance, quality and appearance.

AIR CONTROL, INC.
SALES DIVISION OF HASTINGS AIR CONDITIONING CO.
720 BRANDEIS THEATRE BLDG., OMAHA 2, NEBR.

We are interested in HASTINGS equipment, please send:
Catalogue on ____DX, ____Water, ____Gas Unit Heaters
Prices on ____DX, ____Water, ____Gas Unit Heaters
We are a ____Dealer, ____Distributor, ____Sales Agent
(DESIRABLE TERRITORIES AVAILABLE)
Name ____
Address ____ City ____ State ____
(PLEASE ENCLOSE YOUR LETTERHEAD WITH INQUIRY)

Air Conditioning Advertising

Is It In a Rut? 'Keep Cool' Angle Is Fine, But How About Plugging Cleanliness, Dehumidifying Qualities, Health Values, and Efficiency

Is the advertising of air conditioning at the retail level doing the job that it should?

An analysis of the air conditioning advertising that appeared in New York City newspapers in 1951 reveals a certain sameness in the appeals used to get the public to buy, and a failure to emphasize the importance of air conditioning to better and more healthful living, according to P. Bernard Nortman, who made the survey.

Nortman is a New York economist who has made a special study of the air conditioning field (other articles have covered sales approaches) and his analysis of the advertising should interest distributors and dealers, as well as manufacturers of air conditioners.

By P. Bernard Nortman, Economist, New York City

Now that spring is here again, copywriters for the manufacturers and distributors of home air conditioning units are once more putting pen to paper to promote their product. Will they continue the theme of the past that air conditioning provides cool comfort—or will they undertake to develop home air conditioning as a billion dollar essential utility?

If the past year's pattern is followed, newspaper copy will again tell you to "Keep Cool This Summer," sometimes with icicles dangling from the word cool, to "Order Your Summer Comfort Now" or to "Enjoy Restful Sleep This Summer." In fine print and less emphasis you will discover other advantages in air conditioning: it dehumidifies the air, (too bad if you do not know the significance of this), circulates the air, removes dirt, dust, and pollen, and brings relief to asthma and hay fever sufferers.

Now that you are supposed to be convinced that you must have an air conditioning unit in your home, the advertisement will stress the attributes of the particular brand or distributor it is featuring. Free service and installation, low price and high value, rent or buy on easy terms, fit it into any window, plug it into any outlet, select the color to go with your decor, free trial offer, and 5-year warranty are the inducements offered to clinch the sale.

Did this appeal convince the public that it needed home air conditioning last year? In spite of material shortages and lack of productive capacity, the demand for room air conditioners in 1951 was not sufficient to produce a seller's market. The number of units sold, which had more than doubled from 1949 to 1950, went up by only 29% from 1950 to 1951.

Stocks Up Despite Shortages

In retail value, room air conditioners represented only about 10% of the total air conditioning industry last year. Surplus stocks of room conditioners piled up at the retail level, particularly in the North. Many of the difficulties, of course, were due to the same problems encountered by most of the appliance field. Nevertheless, is the nature and extent of home air conditioning advertising of a caliber sufficient to stimulate the public to buy the product?

To answer this question, a classification and analysis of air conditioning advertising in New York City newspapers in 1951 were undertaken. The total number of individual advertisements for air conditioning placed in New York City newspapers last year, whether inserted by manufacturers, distributors or retailers and regardless of size, was about 550, almost half of which appeared in the *New York Times*. For this article, 225 advertisements were studied in detail, the bulk of which appeared in the *New York Times*.

Who Does the Advertising?

Who placed these advertisements? Although there are about 45 manufacturers putting out room or store air conditioners and any number of distributors and dealers who sell them, the over-all number of advertisers in New York City newspapers did not exceed 30, eight of whom were manufacturers.

These advertisers repeated their advertisements with very slight if any changes; they tend not to vary their copy, no matter how often or in which paper they advertise. About one-third of the total advertisements studied were different; the remainder were either exact replicas or duplicates with slight changes, chiefly in the heading.

Excluding retailers, total lineage of air conditioning advertising in New York City newspapers in 1951 was 78,000 lines, a mere third of the 261,000 lines devoted to refrigerator advertising, for example, an appliance for which the market is highly saturated. Comparisons with other products show a similar inadequacy in the lineage given to air conditioning advertising; radio and television, 1,406,000 lines in New York City newspapers in 1951; jewelry and silverware, 90,000; and alcoholic beverages, 4,330,000.

15% Are Quarter-Page or Larger

The air conditioning advertisements ranged in size from a 4-in., one-column box to a full page spread. For the most part, they are two columns wide and 4 to 10 in. in length. About 15% were ¼ of a page or more in size. All but a few of the large advertisements were placed by air conditioning manufacturers, who, as is to be expected, generally had better copy, more interesting and varied pictures and cartoons and larger print than the smaller retail and distributor advertisements.

At least one picture was featured in the majority of the advertisements, usually of the air conditioner itself. Large advertisements generally showed a person suffering and perspiring on a hot, humid day, contrasted with another picture depicting the comfort afforded by air conditioning units.

Deadly Uniformity of Copy

Headlines of all the advertisements were typically uniform, varying only in words, not content or appeal. More than half the headlines were concerned with coolness and comfort. Except for a few original and provocative ideas, headlines of most of the advertisements stressed either "Beat Summer Heat" or "Immediate, Free Delivery and Service." In almost every case the trade or brand name appears as part of the headline, sometimes supplanting the slogan as the chief focal point.

Typical headlines read: "Place Your Order Now for Cool Weather," "Keep Out the Heat," "Buy Summer Comfort Now," "How to Get Sleep on Hot, Muggy Nights"; and in the other category: "10-Day Free Trial," "Free Delivery, Installation, and Service," "You Can Now Rent or Buy."

A very occasional headline emphasized the health or utilitarian value of air conditioning, like "Frees Babies from Heat, Rashes and Discomfort." A manufacturer of store air conditioning, whose advertising was in marked contrast to the home air conditioning advertisements, appealed to shopkeepers with such ideas as "Multiply Your Manpower," "You Sell Good Will," "Customers Are Perishable."

Stress Advantages, Brands

As for the descriptive material in the advertisements, two categories are noted: One is concerned with the benefits of air conditioning per se, the other with the advantages of the particular brand or model or terms of sale of the advertiser.

All the qualitative ideas found in the first group can be summed up in the following items:

keep cool, be comfortable, sleep on hot nights, make your own weather, relax and look younger and lovelier, dehumidifies the air, filters the air, removes dirt, dust, and pollen, relieves hay fever and asthma, eliminates outside noise, ventilates with windows closed, keeps room clean, eliminates drafts, circulates the air, provides fresh air, for use in home or office.

Besides the picture of the air conditioner, about one-fourth of the advertisements illustrate one of these ideas with another picture.

Most of the advertisements mention four to six of these items, the most popular of which by far are "keep cool" and "dehumidifies." The fact that air conditioning filters the air and removes dirt, dust, and pollen, appears in at least half the advertisements, usually in small print.

Hay fever and asthma relief are mentioned in about one-fourth of the advertisements, as is the elimination of outside noise. That air conditioning units may be used in home or office is specified in about 30% of the advertisements. The fact that the room is kept clean was mentioned, but very infrequently. Never was it graphically illustrated.

In the second category, stressing the value of the particular brand, model, or advertiser, were the following points in order of most frequent occurrence:

low priced or good values, free service, delivery, or estimate, no plumbing or water or extensive building alteration, easy payment, quiet, efficient operation, easy installation, warranty, high quality, and dependability, plugs into outlet, easy control, good looking, and fits into any window. Appearing in 10% or fewer of the advertisements were such additional items as low cost of operation, free trial period, price quotation, rent or buy, self-contained unit, all sizes, and trade in your old fan or ventilator.

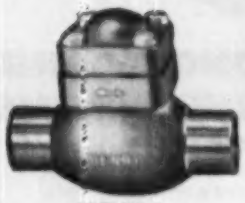
(Concluded on next page)

you pay—
no premium for..
the extra advantages
found in
Henry products
or for the extra satisfaction
that follows their use

STRAINER
Angle type with patented distortion-proof flange

Y-STRAINER
Brass plated. Welded steel construction with forged brass connections. Size ½" O. D. S. through 4½" O. D. S.

BALANCED-ACTION PACKLESS LIQUID LEVEL GAUGES
Valves are backseating—diaphragms may be inspected or replaced without loss of liquid. Conforms with all safety code requirements.


CHECK VALVE
Piston Type For Freon. Sizes ½" through 4½" O. D. S.

DRIER
Cartridge type with dispersion tube

EXTRA CAPACITY DRIER
2 cubic inches more than established practice. Forged brass end caps.

DIAPHRAGM SEALED VALVE
Large capacity—fast positive relief and reseating action. Very small differential between opening and closing pressures.

STRAIGHT-THROUGH BRINE VALVE
Large capacity—All Brass Construction. Sizes ½" M.P.T. through 1" F.P.T.

. . . Write for these catalogs

No. 100 Packless and packed valves, strainers, driers, ammonia valves, check valves, relief valves, three-way valves, seals traps, liquid gauge sets, flange unions, nut unions and accessories for air conditioning and refrigeration and industrial uses.

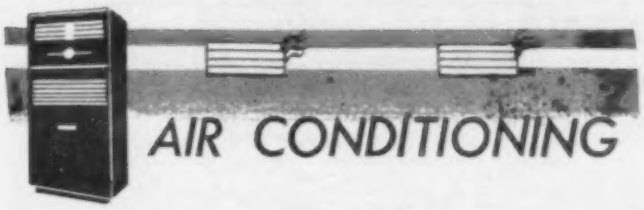
No. 70 Drop forged and cold rolled steel fittings.

Stocked and Sold by Leading Jobbers

HENRY VALVE COMPANY
MELROSE PARK, ILLINOIS (Chicago Suburb)
CABLE ADDRESS MELROSE PARK ILLINOIS

LOOK TO LA CROSSE FOR THE BEST IN QUALITY REFRIGERATION EQUIPMENT

LA CROSSE COOLER CO.
Factory and Gen'l Offices: 2801 Losey Blvd. S., La Crosse, Wis.
Export Office: 50 Broad St., New York City. Cable Address: Exlexport.



Home Units Are More Than Luxury Items

(Concluded from preceding page)

The most frequently mentioned items on "good values" and "free service" and "estimate" appeared in about one-third of the advertisements. It is interesting to note that although only about 10% of the advertisements mentioned "rent or buy," where this item does appear it is often the headline.

Seasonal Concentration

The 1951 air conditioning advertising in New York City newspapers showed a most pronounced seasonal concentration. Except for a few isolated advertisements which began to appear early in the spring, practically all were jammed into the months of May, June, and July, petering out to almost nothing as the fall approached. Appliance dealers ignored their air conditioners until the heat of summer threatened or was upon them. Even the big manufacturers who are going into the production of year-round units, did next to no consumer advertising last year in the newspapers of New York to set the stage for widespread public recognition of the need for and acceptance of air conditioners.

So much for the details. In general effect, the impression created by the air conditioning advertisements that appeared in the New York City newspapers last year is 1) that you can keep cool with an air conditioning unit and 2) that a particular brand is to be desired for this, that, or the other reason.

Is this impression adequate to establish air conditioning as the next vital industry in man's control over nature for human improvement, extension of life and higher living standard?

In the first place, even the keep cool emphasis was directed not at better health, greater production and home efficiency, to save wear and tear on human resources and energy, cut time and labor expended, protect furniture and furnishings, or reduce cleaning and repair bills. The keep cool approach was luxurious in its appeal—for comfort, relaxation, to escape from reality, not to live and function better.

The difference between industrial and commercial air conditioning advertising and home air conditioning advertising in this respect is glaring.

Commercial Advertisers Have One Approach—Utility

Advertisers of industrial and commercial air conditioning have only one approach—its utility. They appeal to the direct, primary interest of their consumers, with stress on the production of better product, increase in manpower, sales and customers, and elimination of seasonality in industry caused by natural weather conditions. Similar motives prevail for the introduction of air conditioning into the home, but the advertisements either ignored them or buried them in the smallest type.

Where direct appeal was made on the grounds of health, it was limited to a small section of the population—the hay fever and asthma sufferers. Of course this is a valid appeal—but the health appeal is also valid for the entire population.

Not to use any of the wealth of material available in medical and industrial studies on the value of air conditioning to promote home conditioning is indeed shortsighted. Not one advertisement spelled out clearly for its readers that the human body is a power plant with a most exacting heat balance, and that while it can adjust itself to a wide range of atmospheric conditions, it often does so at the expense of working efficiency.

Don't Ignore Health Benefits

Not one advertisement tried explicitly to overcome public indifference to and ignorance of atmospheric conditions as a factor in human health, comfort, and efficiency and to instil the understanding that home air conditioning can improve worker productivity, decrease the susceptibility to the common cold and other infectious diseases, reduce fatigue and heart strain, and promote physical and mental alertness.

Even the advantages of air conditioning that appeared frequently and in good sized print were couched in terms so general and abstract as to leave little impression. Take "dehumidifies" for example. Two-thirds of the advertisements made some reference to humidity. Yet not one explained what relative humidity is, how it is measured, how it is related to temperature, or what its significance is to human health, comfort, and efficiency. For the most part, the best selling appeals were underplayed in small print, bore no relation to the headlines, and were vaguely stated.

On the other hand, much space and emphasis were given in the advertisements to the ease of acquiring and operating an air conditioning unit. Free service, good value, good looks, easy payment—these items were stressed, highlighted by a picture of the conditioner.

Also prominently displayed in the headings were trade and brand names. All the advertisers emphasized these names for their prestige value. In fact, a number of advertisers specialize in this type of advertising. These strongly competitive advertisements fight each other for the attention of a consumer whose mind is still very uncertain as to the value of any air conditioner.

Educate—Don't Compete, Yet

This competitive approach in advertising is understandable and has its place; but its emphasis is questionable in a market less than 1% saturated. The challenge to home air conditioning advertising is not to overplay a particular brand or model. It is to arouse the public to the indispensable utilitarian nature of air conditioning. Once this has been done the public will come clamoring for more units of all brands.

So thoroughly has the notion of home air conditioning as a luxury permeated the thinking of the public and even the industry itself, that the advertisers almost confine themselves to the luxury trade. Home air conditioning will *not* develop far in the limited high income market. Its future development into a billion dollar industry in its own right, as distinguished from industrial air conditioning, depends upon the creation of a mass market.

To accomplish this end, air conditioning firms will have to adopt an advertising and promotion program which will so inculcate into the public mind the utilitarian value of air conditioning that people will no more think of living in an unconditioned home than they now think of living without gas, electricity or running water.

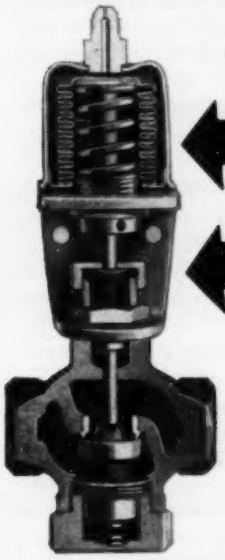
Such a program cannot be built out of air. It will have to rest on the bedrock of scientific studies involving the economic and medical relation between air conditioning and productivity, health and efficiency, on market surveys, on consumer education both in the use of and value of air conditioning, and on appropriate, valid methods of putting across the utility concept to the public.

New Wholesaler To Carry Air Conditioning Equipment

COLUMBIA, S. C.—Dealers Supply, Inc., capitalized at $50,000, has been organized here to deal in wholesale building material and supplies of all kinds including air conditioning equipment. W. C. Boyd is president.

TWO BIG REASONS

for insisting on Marsh-Electrimatic Regulators



Two-ply bellows has more than twice the life of single-ply

Break-down tests prove that the Marsh-Electrimatic two-ply bellows has 2½ times the life of an equivalent one-ply bellows. This is because a single ply bellows must be made of heavier gauge metal . . . and naturally the heavier metal rapidly breaks down under the fatigue of flexing.

Boot eliminates packing — friction

At one time the best way to eliminate packing was with a metal bellows, but this Neoprene boot has all the advantages of a bellows plus ten times its life. We have repeatedly proved this, too . . . by cycling the boot, without failure, under actual operating conditions *ten times as long as we could cycle the best metal bellows.*

These are just two of the many features that make the Marsh-Electrimatic last longer and function better. They are typical of plus values found in the entire Marsh-Electrimatic line. Write us or see your wholesaler.

THE ELECTRIMATIC CO. *Sales affiliate of Jas. P. Marsh Corp.,* Dept. D, Skokie, Ill.

MARSH-Electrimatic

STOP USING WATER!

UNICON by KRAMER

REMOTE TYPE AIR COOLED CONDENSER

Inside the Brunners you are valve plates precision by skilled craftsmen to perfect leak-free sealing.

On the Brunner commercial refrigeration assembly line the only watchword is "Quality first—then volume."

To meet the Brunner standard of long service life, wearing surfaces are heat treated and hardened under watchful eyes.

These Inside Advantages have sold BRUNNER in every block

Check over the prospects for refrigeration in your district—supermarkets, department stores, bar and grills, drug stores, food and manufacturing plants—in every block you'll find these and others too. Whatever the business they *all* buy on the basis of dependable performance...of built-in high efficiency. That's a tremendous help when you sell Brunner, the refrigeration equipment with a long list of "inside" design and construction advantages. Let us show you these features and how they simplify matters for you in sales, installation, and servicing.

Brunner stands at your side with experienced factory field men to help you when you want assistance.

For full details, write us today.

A size and type for every purpose

BRUNNER MODEL A-300 Air Cooled Refrigeration Condensing Unit (illustrated) is one of 69 air and water cooled models from ¼ hp. to 75 hp. designed to meet virtually every requirement, including low temperature applications down to −140°F.

BRUNNER SINCE 1906

COMMERCIAL REFRIGERATION

—BRUNNER MANUFACTURING CO., UTICA 1, NEW YORK, U. S. A.—

BRUNNER SINCE 1906

AIR CONDITIONING Self Contained Units to 10 hp. For remote installation—Brunner Condensing Units to 75 hp.

REFRIGERATION Condensing Units from ¼ hp. to 75 hp. 69 Air and Water Cooled Models.

AIR COMPRESSORS Single stage ⅛ hp. to 2 hp. Two stage 1½ hp. to 15 hp. Horizontal and Vertical Models.

They'll Do It Every Time . . . . By Jimmy Hatlo

POOR MILO, THE TRAVELING MAN ··· IN MIDSUMMER HE ALWAYS DRAWS A COOP WITH ONE WINDOW FACING A BRICK WALL ···
BUT—IN TEN-BELOW WEATHER ··· WHAT DO THEY GIVE HIM? YOU GUESSED IT— THE CORNER ROOM WITH NORTHERN EXPOSURE ···
THANK AND A TIP OF THE HATLO HAT TO BOB MARRIOTT, 3460 DARLINGTON ROAD, AVONDALE, CANTON, OHIO
12-26
JIMMY HATLO

Do You Have "Both Feet On The Ground"?

20 TON
10 TON
NO WATER needed for condensing
WITH THE
UNICON by KRAMER
Remote-Type Air-Cooled Condenser that eliminates all water problems! Any size compressor, regardless of tonnage, can be air-cooled with UNICON by KRAMER.
Stands, hoods, and wind deflectors are available for simplified outside mounting.
40 TON

WRITE FOR BULLETIN U-177-B

KRAMER TRENTON CO. • Trenton 5, N.J.

AN INTERNATIONAL INSTITUTION • SUBSCRIBERS ALL OVER THE WORLD

Trade Mark registered U. S. Patent Office; Est. 1930

AIR CONDITIONING AND REFRIGERATION News

Copyright 1952, Business News Publishing Co.

F. M. COCKRELL, *Founder*

Published Every Monday by BUSINESS NEWS PUBLISHING CO. 450 W. Fort St., Detroit 26, Mich. Telephone Woodward 2-0824.

Subscription Rates: U. S. and Possessions, Canada, and all countries in the Pan-American Postal Union: $5.00 per year; 2 years $8.00. All other foreign countries $7.00 per year. Single copy price, 20 cents. Ten or more copies, 15 cents each; 50 or more copies, 10 cents each. Please send remittance with order.

GEORGE F. TAUBENECK
Editor and Publisher

PHIL B. REDEKER, *Editorial Director*

C. DALE MERICLE, *Associate Editor*

JOHN SWEET, *Assistant Editor*
HUGH MAHAR, *Assistant Editor*
GEORGE HANNING, *Assistant Editor*
MARGARET DEAN, *Assistant Editor*
Editorial Assistants: BERNICE SHEPLOW, DOROTHY FRITZ.

E. L. HENDERSON, *General Manager*
ROBERT M. PRICE, *Adv. Mgr.*
ALLEN SCHILDHAMMER, *Western Adv. Mgr.*
ALICE M. BARROW, *Adv. Secy.*
WALTER J. SCHULER, *Production Mgr.*
GEORGE CASEY, *Circulation Manager*

Member, Audit Bureau of Circulations. Member, Associated Business Papers.

VOLUME 65, NO. 16, SERIAL NO. 1,205, APRIL 21, 1952

"I have always felt that whatever the Divine Providence permitted to occur I was not too proud to report. The people are not served by pussyfooting, or by that sort of journalism in which nobody will ask who is the editor of a paper or the writer of an article, and nobody will care."—*Charles A. Dana.*

Let's Be Realistic About Air Conditioning

HOW often in the last several years have you heard air conditioning engineers declare: "We must put in soundly engineered installations lest our industry will suffer a black eye" whenever discussions about prices or methods took place?

This argument has held sway for a long time, and has seemed practically irrefutable.

Today, however, we are running across more and more comments like the following, which is quoted from a syndicated newspaper column: "Some of these refrigerated theaters are kept so cold that one suspects the managers are going on the theory that we customers are fresh meat and will spoil."

In attempting to avoid a "black eye" by insisting on "adequate" installations, the industry has actually received the darkened optic it so feared.

Why? Because the human factor was not sufficiently considered. Air conditioning has been controlled by engineers for too long.

The latter, praiseworthy and indispensable though they be, have been accustomed to working with mathematical formulas, and with laboratory conditions. They have given the public what they figured it ought to have—rather than what the people desired.

Had salesmen been in the saddle, they would have been much more inclined to give the public what it wants.

And what the public wants, it now develops, is not scientifically controlled temperatures and humidity, but *comfort* and *peace-of-mind*. Engineers, with their "adequate" and expensive installations, have predicated "ideal" conditions, just as they previously had given factories ideal conditions for the control of industrial processes.

But, it turns out, people are made uncomfortable by "ideal" indoor conditions when the latter differ so drastically from outside temperatures and humidities. What the public wants is relief, and this relief is obtained through a *modest differential* between outside and inside conditions.

Not all installations, of course, have been designed to establish an inside temperature of 72° to 78° F. plus a 50% relative humidity. Especially in the last few years the practice of providing for a differential of 15° to 25° between inside and outside temperatures has become more prevalent.

Thus, ever since manufacturers of room air conditioners began selling small, low-priced units in tremendous volume, it has become more and more difficult to accept the theory that such manufacturers are giving the air conditioning industry a "black eye."

Salesmen know that there is a demand for air conditioning units which will afford *some relief* from heat and humidity. Since such small units do provide some relief—even if engineers declare that they are inadequate—it is altogether possible that those who buy them will consider that they have received their money's worth.

In the light of recent experience, it would seem that the air conditioning industry is less likely to receive a "black eye" from units which don't give enough cooling effect than it is from installations which give too much.

Q. E. D.

Handling Air In Atomic Plants

'Air Locks' Between 'Hot' and 'Cold' Pressurized Zones Prevent Spread of Dangerous Radioactive Materials

SEATTLE — "Air locks" between "hot" and "cold" pressurized zones are being used to protect personnel against deadly air-borne contamination in atomic plants and laboratories, it was disclosed here at the spring meeting of the American Society of Mechanical Engineers at the University of Washington.

New materials produced by nuclear fission, "more poisonous than anything previously known" are being processed on an industrial scale, and call for "extraordinary measures" to provide adequate protection for personnel working in close proximity with this type of substance, W. W. McIntosh, staff engineer, General Electric Co., Richland, Wash., told the ASME.

McIntosh said the principal sources of air-borne contamination were gases and vapors evolved during processing, dusts resulting from evaporated solutions, and particles released during handling of solid materials. Protecting workers against these is a job for the ventilation system of the plant or laboratory, he declared.

RADIOACTIVE MATERIALS DANGEROUS 2 WAYS

Radioactive materials are dangerous to living matter in two ways, McIntosh pointed out: one, by virtue of damaging radiation, and two, by poisoning on entrance of the material into the body.

"Materials of the first classification must be handled remotely and from behind shielding," he said. "Arrangements for protecting personnel within operating buildings from the hazard of these materials is, in some respects, the less difficult, largely because of the necessary remoteness of the operator from the source of danger."

Handling radioactive materials which are not emitters of dangerous radiation, however, is another matter, he said, explaining that it would be quite simple except for the "extremely toxic properties" of many of these substances.

"Previous industrial and chemical experience included processing many highly poisonous materials, but some materials encountered in nucleonic work are more poisonous than anything previously known," the G-E engineer said.

PROVISIONS MUST BE MADE FOR ACCIDENTS

In addition to providing protective ventilation for normal processes which take place in hoods and equipment, design consideration must be given to the effects of all types of accidents such as explosions, fires, spills, and other personnel errors, said McIntosh.

"An accident might make a room, or possibly a whole building unsafe for occupancy; consequently, all practicable measures must be provided in the design for limiting the spread of radioactive contamination in the event of such an occurrence," he declared. "This is achieved by compartmentation of the building to such an extent as is compatible with efficient operation, and by design for controlled direction of airflow."

In designing for directional control of airflow, he said, one method is to provide controlled differential air pressure between areas of different degrees of hazard. These areas are usually designated as zones, the uncontaminated areas being termed "cold" and areas of greater risk termed "hot."

"The zones of different hazard levels are completely separated structurally," McIntosh explained. "Access between zones is through air locks. Within each zone air is supplied to areas of least risk and exhausted principally from equipment, hoods or other areas of highest risk. Ventilation balance within the zone is such that flow through doorways is always toward the more hazardous side.

"The air locks are not ventilated, but on opening the door toward the 'hot' side air will leave the air lock toward the zone of lower pressure. When the air lock door to the 'cold' side is opened air will flow from the higher pressure area into the air lock; thus, air movement is in the proper direction. Air lock doors may be interlocked to prevent simultaneous opening which might upset the ventilation balance."

A modulating damper is provided in the exhaust system to maintain a constant exhaust pressure so as to hold the quantity of air exhausted at a constant value, he pointed out, adding that separate modulating dampers maintain their respective zones at pre-set pressure levels.

Another method of designing for controlled direction of airflow is to devise an architectural and ventilation arrangement wherein air is admitted to the cold zones and exhausted from the hot zones. Both systems are effective, he said, the choice of system being based on a detailed study of the operations to be performed in the building, heating and cooling loads, and structural and architectural arrangements.[3]

Under the first system called the "zone pressure ventilation system," he said, maintenance of design pressure differentials between zones depends on the operation of the zone modulating dampers. If, in the event of failure of any of these dampers or for any other reason, the designed differential is lost, alarms are sounded and corrective action must be taken.

"The provision of one source of supply air and one exhaust system for all zones avoids the danger of zone pressure differential violations which might be caused by failure of one of several separate supply or exhaust systems, he said. "This alone is a determining factor in over-all design since reversal of airflow which might be caused by the failure of a single fan cannot be tolerated in some buildings for a few seconds.

"In the event of power failure it is seldom practicable to operate the entire ventilation system on auxiliary power supply. This contingency is usually met by providing exhaust ventilation only, at a reduced rate, with all automatic dampers on the supply system assuming an open position. Zone pressure differentials are not maintained under these conditions, but airflow is provided in safe directions. Ordinarily, operations within the building are curtailed as much as possible during power failures.

VARIATIONS ON BASIC SYSTEM INVOLVE FAILURE RISK

"Variations of this basic system have been used, but each departure usually involves the risk of failure of the additional component and the possibility of a resulting unsafe condition. The effect of failure of each component of the system (dampers, fans, and controllers) must be studied, and, insofar as possible, provisions must be made for each component to 'fail-safe'; that is, to assume such a condition in failure that the safety features of the system will not be compromised."

With proper planning of space and processes it is frequently possible to provide a ventilation system which will insure airflow in safe directions without zone pressure control. McIntosh described such a system, which he called a "series flow system."

"With the series flow system rather high rates of air change are required to satisfy comfort conditions in the zone of final air use," he said. "Special care must be exercised to prevent drafts from supply terminals and through doors. Excessive air movement may cause the spread of contamination within the 'hot' zone or from an 'intermediate' zone to a 'hot' zone as well as personnel discomfort."

Regarding the problem of disposal of the air-borne contamination after it is directed into the exhaust ventilation system, McIntosh said that in general, the particulate matter is removed from the air stream by filters and gaseous matter is removed by scrubbing. As a further safeguard, the final discharge point of exhaust ventilation may be from a stack 200 ft. or more in height.

"Despite the remarkably high efficiencies attained with filters and scrubbers there still remains the necessity for achieving dilution and dispersal of the ventilation exhaust from certain buildings, particularly from those in which processes are carried out on a production scale," he said. "For certain processes, where such control can be arranged, it is the practice to discharge process exhaust only during those periods when weather conditions are favorable to wide dispersion and consequent good dilution of the exhaust air. Well equipped weather stations are usually maintained to supply the advance weather information required for this control."

McIntosh said an extensive program of air, dust, vegetation, and wildlife monitoring over a wide area is maintained on a continuing basis to test the effectiveness of these measures at the G-E works.

for all water cooling -- use *Filtrine* —sell more condensing units

"DO" Orders are Vital!

For all Federal Agencies . . . All Armed Services . . . Filtrine products meet government specifications.

Promote your own condensing unit sales with Filtrine's 20-year-life construction . . . high capacity . . . Super Storage . . . more than 40 years' dependability.

MC-14-S MC-25-S MC-43-S MC-49-S

COOLERS FOR MESS HALLS — CAFETERIAS

Taste-Master

Sell your condensing unit with Filtrine Stainless Steel or Duco finished cabinets, equipped to suit with top/side shelves, bubblers, glass-fillers. Can be Taste-Master equipped to remove chlorine, rust, sediment from water.

PH-7 PH-14 PH-28

COOLERS FOR X-RAY & PHOTOGRAPHY

Sell your condensing unit with Filtrine models repeatedly named by V.A., Signal Corps, Air Force, etc. for X-ray and photo-labs. Under counter design and floor-mounted models with stainless steel work-table top. Filters (extra) to prevent scratched and pin-holed negatives.

Typical 'Packaged' Circulating Chilled Water System

PACKAGED CIRCULATING CHILLED WATER SYSTEMS

Sell your condensing unit! Systems for drinking or processing water—completely packaged with pump, controls, your condensing unit factory installed. Capacities 5-400 g.p.h.; storage 5-150 gals. Filters and Rectifier-Dechlorinators (extra) to insure taste-free, sparkling water.

REMOTE COOLERS

Sell your condensing unit with remote models for new and replacement jobs — all applications. Capacities 10-1000 g.p.h.; storage 7-300 gals. Filters, Rectifier-Dechlorinators available for all sizes.

Remote Model Coolers

Get our new *"How to Sell DO Jobs"*—write Dept. RF1

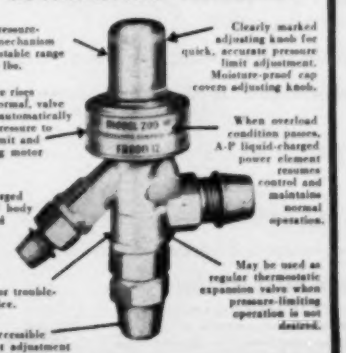
Filtrine — FILTRINE MANUFACTURING COMPANY · BROOKLYN 5 · N. Y.

"Water Coolers and Filters for 40 Years"

IT'S ALL IN THE HEAD

the secret of A-P No. 209 Universal Thermostatic Expansion Valve

7 OUTSTANDING FEATURES


Unique pressure-limiting mechanism with adjustable range of 0 to 55 lbs.
If pressure rises beyond normal, valve throttles automatically holding pressure to pre-set limit and preventing motor overload.
Heavy forged leakproof body Superhard stainless valve needle, stainless seat and springs for trouble-free service.
Easily accessible superheat adjustment covers entire normal operating range. Maintains close superheat control at any operating temperature.
Clearly marked adjusting knob for quick, accurate pressure limit adjustment. Moisture-proof cap covers adjusting knob.
When overload condition passes, A-P liquid-charged power element resumes control and maintains normal operation.
May be used as regular thermostatic expansion valve when pressure-limiting operation is not desired.
MODEL 209
FREON 12

DEPENDABLE Controls

Yes, the A-P No. 209 is the ideal, all-purpose thermostatic expansion valve. One easy-to-dial adjustment on the valve head provides complete, precise pressure-limit control. A valve you can use at any pressure limit . . . in any position . . . in any ambient temperature . . . on any application. Adjusts for any superheat, too.

Think of the time-, labor- and money-saving advantages of this unique valve. Use it on original equipment or for replacement service. You can't beat its practical adaptability and economy on any job.

Examine its unique construction . . . rugged forged brass body, liquid-charged power element, stainless steel needle, seat and springs. You'll see substantial reasons for the outstanding reputation that A-P has built for quality merchandise.

A-P refrigeration valves last for years of economical, trouble-free service.

A-P CONTROLS CORPORATION

(Formerly Automatic Products Company)

2460 N. 32nd Street • Milwaukee 45, Wis.

In Canada: A-P Controls Corporation Ltd., Cookeville, Ont.

Stocked and Sold By Good Refrigeration Wholesalers Everywhere • Recommended and Installed By Leading Refrigeration Service Engineers

What's New

When requesting further information on new products, please use "Information Center" form.

4-Ft. Refrigerated Restaurant Case Speeds Service

KEY NO. B-430

CHICAGO—Announced by Bastian-Blessing Co. here is a new 4-ft. stainless steel refrigerated display case designed to "speed service and to sell more salads and desserts by better display."

Salads, cream pies, and other perishable foods can be stored, ready to serve, on the bottom of the case and on its two wire shelves, where they can be plainly seen through the glass panels which form the sides of the case and through the sliding glass doors in front.

The mirror backing of the case and a fluorescent light concealed in the top are other features.

When mounted on a sandwich table, the case is said to speed the service of prepared-to-order foods.

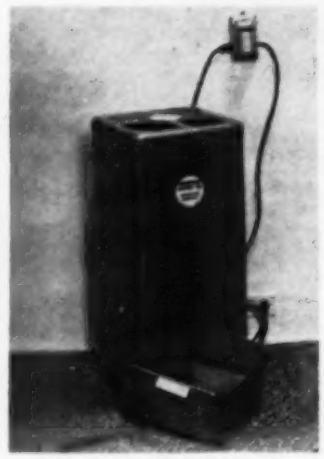
Heat Loss Calculator Aids Home Heating Estimator

KEY NO. B-431

BLOOMINGTON, Ill.—A calculator that is claimed to save 11 steps in figuring heat loss in estimating for residential heating equipment is made by the Climatemaker Heat Loss Calculator Co. here.

Called the Climatemaker heat loss calculator, the instrument gives these answers: B.t.u. loss for each room plus total loss from house; c.f.m. requirements for forced warm air, Gravity 200° and Gravity 175° heating units; sq. ft. of steam or hot water radiation required to heat each room; pipe area—pipe, stack, and blower sizes for warm air heating systems; and cost of heating per season.

Optional Automatic Control on Abbeon Dehumidifier



KEY NO. B-432

JAMAICA, N. Y.—A new industrial dehumidifier that will handle an area of approximately 13,500 cu. ft. is now being produced by the Abbeon Supply Co. here.

Called the WA-5, the unit is equipped with a ½-hp. compressor operating on 115 volt, 60 cycle, a.c.

The WA-5 can be supplied in three ways: without automatic control, with plug-in control, and with built-in control.

For continuous or intermittent operation without automatic control, the unit is plugged into a 110 volt, a.c. outlet. When sufficient moisture has been removed from the air, a switch on the unit is snapped to the "off" position.

When supplied with the plug-in control, the unit is plugged into the control and the control plugged into the electric outlet. A dial on the control is set at the percentage of humidity desired. The humidistat then turns the dehumidifier on and off without further attention to maintain the proper humidity level.

The dehumidifier is also available with the control built right into the front as a permanent part of the unit. In this case it is just necessary to plug the dehumidifier into the wall socket and set the control for automatic operation.

The unit is equipped with a pan that can be emptied by hand. A fixture is also provided at the bottom for attaching a length of hose or pipe which can be led to the nearest drain.

Without the automatic control, the WA-5 is priced at $179.50. The control is $35 extra.

Power Saw Can Handle Stacked Sheet Metal

KEY NO. B-433

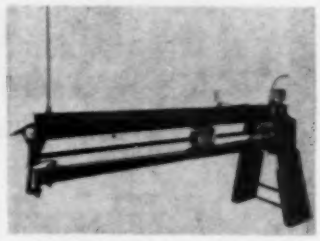
HOPKINS, Minn.—A power saw designed to speed production in sheet metal shops has been introduced by Bett-Marr Mfg. Co. here.

A speed range from 125 f.p.m. to 2,200 f.p.m. makes it adaptable to a variety of materials including plastic, sheet metal, and wood. According to the manufacturer, the saw can handle stacked sheet metal at speeds up to 15 in. per minute.

Chain drive gear allows full power at slow speeds for cleaner, faster cutting of iron and steel castings, and forgings. An extra depth 8¾-in. cut is especially adaptable for finishing castings.

The saw will handle complicated cutting jobs for ductwork fittings in a fraction of the time necessary for hand cutting the manufacturer states.

Over-all dimensions are depth 34 in. and height 34 in. A design table 20 in. by 22 in. is adequate for large work.



Automatic Joiner Seams Sheet Metal In 40 Secs.

KEY NO. B-434

NEW YORK CITY—A sheet metal joiner that can automatically seam sheet metal of any thickness from 18 to 30 gauge has been developed by the Standard Power Groove Machine Corp. here.

In 40 seconds, by exerting 11,000 p.s.i., the joiner permanently seams two sheets of metal, an operation that would ordinarily take three times as long, the company claims.

Working from pressure derived from force which the roller assembly exerts against an overhead structural steel beam, the joiner travels in one direction and then automatically reverses direction for a second and final smoothing operation.

Square or round piping or straight seaming may be handled by this new machine which is almost silent in operation compared with other methods. The unit can take any piping up to 8 ft. in length and is only 10 ft. long over-all.

Stainless Steel, White Front Case Presented

KEY NO. B-435

YONKERS, N. Y.—Frigid Igloo Mfg. Corp. here has announced a new stainless steel and white front full vision display case.

Features of the case include vitreous acid-resistant porcelain shelves and grates, rubber sliding doors glazed with Thermopane, one half-inch spaced triple Thermopane front, and fluorescent lighting on top and under each shelf.

GENERAL SCOOPS the MARKET Again!
with this Terrific VALUE in a SLOPE-FRONT FREEZER

Why Pay More
You can't buy a better freezer at any price... Yet, General offers this new, counter-high, formica-top freezer, with a guarantee of quality at this low price.
$399.00 net f.o.b. N.Y.
Complete with Unit

Why this is America's Best Freezer Value!...

- DUAL-PURPOSE... (1) A modern Self-Service Freezer—6 feet long; (2) Spacious Counter for scale, displays, "check-outs," etc.
- SLOPE FRONT with interior Fluorescent Lighting shows foods with highest visibility—increases buy-appeal.
- FORMICA "LIFE-TIME" TOP can be furnished in any desired length.
- FULL-WIDTH REFLECTING MIRROR provides the extra attraction that means extra sales.
- SELF-CONTAINED with ⅓ H.P. Hermetic Condensing Unit, standard make.
- GLEAMING WHITE ENAMEL on bonderized steel... made to last!
- PAYS FOR ITSELF in added volume and profits—in short time!

UNCONDITIONALLY GUARANTEED!
This guarantee is backed by General's 25 year old reputation. If, on installation, SF-6 Freezer does not perform to complete satisfaction, we will take it back without question, pay return freight costs and REFUND YOUR MONEY IN FULL!

Our famous ABM Put-Vision Display Case is still available at its old "rock-bottom" price of $349

Manufacturers Since 1926
GENERAL REFRIGERATORS CORP.

AUTO-LITE
...for Temperature Indication

3-way adjustable mounting

Model F-1 temperature indicator

Auto-Lite offers many thermometer styles, permitting plant-wide temperature observation at low cost. Standard temperature ranges from minus 60°F to plus 750°F. Send for latest catalog showing various types.

Rigid stem or capillary tubing for EYE-LEVEL remote reading. Priced from $22.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONTARIO

TEMPERATURE INDICATORS & RECORDERS

What's New (Cont.)

2 Infrared Ray Units Feature Large Capacity

KEY NO. B-436

NEW YORK CITY—Hickory Home Products Corp. here offers an infrared ray rotisserie and broiler combination and an infrared ray portable oven, both of which have a 115-sq. in. broiling surface.

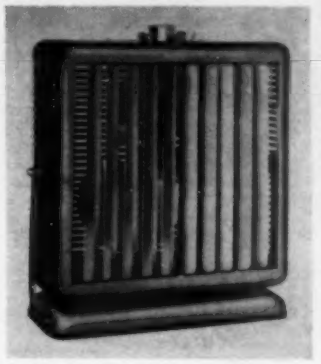
The manufacturer emphasizes the large capacity of both appliances. The combination unit, it is claimed, permits broiling of three large steaks, 15 hamburgers, 20 frankfurters, or 10 chops at a time, or barbecuing of chickens, ducks, roast beef, leg of lamb, etc.

Capacity of the portable oven allows broiling of three large steaks, a whole chicken, 20 hamburgers, 40 frankfurters, or 15 chops at a time.

The rotisserie and broiler combination is 11 in. high, 17 in. wide, and 10¼ in. deep, and has a net weight of 16 lbs. It operates on 110-120 volts, a.c. only. The portable oven is 9¾ in. high, 17½ in. wide, and 11 in. deep, has a net weight of 15 lbs., and operates on 115 volts, a.c. or d.c.

Both units are said to do "a smokeless, odorless, clean job" and to give "quick, controlled" action because of four-level tray adjustment. Other common features are triple chrome plate finish, one-piece shelf construction with no sharp edges, Bakelite feet, heavy asbestos insulated top and double side wall construction, and fold-away handle on broiling platter for compact storing.

The oven is delivered complete with with broiling platter, wire broiling trivet, and cord set.



Chill-Air Line Includes Variety of Fan Types

KEY NO. B-437

KANSAS CITY, Mo.—A line of four-speed fans in a number of different types is being manufactured this year by the National Engineering & Mfg. Co. here.

Included in the "Chill-Air" line are "Turn-a-bout" window fans, "Roll-a-bout" portable fans on adjustable pedestals, "Supreme" room circulators, and exhaust fans. In addition, the company makes an adjustable grille fan and a casement window fan that operates on two speeds.

All of the four-speed fans are made in 16 and 20-in. blade sizes. The 16-in. models are rated at 1,900 c.f.m. and the 20-in. models at 3,300 c.f.m. All the fans are equipped with protective grilles.

The window and exhaust fans are equipped with adjustable side panels to fit windows of from 17 to 37 in. wide, from 21 to 41 in. wide, or from 21 to 37 in. wide

The 16-in. "Roll-a-bout" fan is adjustable in height so that the center of the fan will range from 35 to 56 in. above the floor. On the 20-in. model, the range is from 40 to 58 in. high.

The adjustable grille and casement window fans have 14-in. blades rated at 1,400 c.f.m.

Automatic Gas Furnace Built For Basementless Homes

KEY NO. B-438

BLOOMFIELD, N. J. — A new downflow gas-fired furnace, designed to provide economical automatic heating for basementless houses, has been added to General Electric's automatic heating line.

The new furnace is described as ideal for use with the G-E Air Wall heating system. It may also be used with conventional perimeter heating systems either in slab or crawl space.

S. J. Levine, general manager of the G-E home heating and cooling department, said development of the new downflow unit was in recognition of the nationwide trend to basementless houses. Approximately 60% of the houses built last year were without basements, he said.

The new furnace has rubber-mounted blowers which give it a low level of blower or fan noise, and it uses ribbon burners.

The unit's heat exchanger is made of durable cast iron. Completely enclosing all controls and the draft diverter is a blue-gray jacket.

Unit comes as a complete packaged furnace, factory assembled, wired, and tested.

Quiet Kool ½-Hp. Cabinet Will Fit ¾-Hp. Unit

KEY NO. B-439

NEWARK, N. J. — The new 1952 "Quiet Kool" ½-hp. room air conditioner has been redesigned so that the outer cabinet is identical in size to the ¾-hp. model. This enables the user to change sizes without a completely new installation, it is pointed out.

Because the cabinet is hinged and the control knobs are recessed, the consumer can readily raise the cabinet housing for a quick cleaning of the permanent metal air filter. The easily installed thermostat, an optional feature, can be controlled without the usual unscrewing of the outer cabinet.

A new arrangement of internal parts permits use of a silencing chamber using the blower wheel for air delivery, resulting in more quiet operation. The entire base has also been redesigned so that the use of the wider slinger ring in the condenser fan is able to provide for sufficient condensate disposal even on the most humid days, according to the manufacturer.

The ½-hp. model called the G5E, will carry a suggested retail price of $279.95. The ¾-hp. model called the G7D carries a suggested retail price of $345.

The new ⅓ hp., G3A, introduced this year has a suggested retail price of $199.95.

Information Center

What's New or Current Literature Available

Key No. ..... Key No. .....
Key No. ..... Key No. .....
Key No. ..... Key No. .....

Products Advertised
(list name, page, and issue date)

.....
.....
.....
.....

(PLEASE PRINT PLAINLY)

Name ..... Title .....
Company .....
Street .....
City ..... Zone..... State.....
Type of Business .....

MAIL THIS FORM TO
AIR CONDITIONING & REFRIGERATION NEWS
Reader Service Dept.,
450 W. FORT ST. DETROIT 26, MICHIGAN

Buy Peerless
FOR PERFORMANCE

DRIP-PUMP for Condensate on Air Conditioners

The Peerless Drip-Pump solves the troublesome drainage problem—on air conditioners, coolers, refrigerators and other machines where condensate is present—by eliminating hazardous gravity drains altogether! The Drip-Pump lifts condensate *up and out, overhead* . . . saves valuable space.

Illustration shows Model DP-2 high capacity high lift pump for air conditioner applications. Also available is Model DP-1 packless centrifugal type pump, driven by "flea-power" motor . . . the ideal pump for use for dome, unit or flash coolers. Both models are ruggedly built for long, hard service; easily and quickly installed. Write for full information.

Peerless of America, Inc.
1501 No. Magnolia, Avenue
Chicago 22, Illinois, U.S.A.

Authorized factory rebuilding service
WANTED
by large eastern sealed unit plant—
COMPLETELY EQUIPPED
WRITE BOX 3955
AIR CONDITIONING & REFRIGERATION NEWS

Torture Tests Prove That
IMPERIAL TRIPLE-SEAL FITTINGS
Remain Leakproof

PLASTIC CAPS on flared ends protect fittings during shipping and handling.

In severe tests, Imperial Triple-Seal Flared Tube Fittings had their seats purposely battered like the one in the unretouched photo above. Yet they made up into joints that withstood 250 lbs. Freon pressure without the slightest trace of leakage. Conventional fittings, subjected to the same treatment, had to be refaced before they would hold the Freon.

Imperial Triple-Seal Flare Fittings have 3 seals to give you new, extra protection against leakage.

And here's why: a groove is machined into the face of the seat on Imperial Triple-Seal Fittings bringing you *triple-seal tightness in every joint.* When the flare nut is drawn up, the copper tubing is forced into this groove making a tight, self-sealing joint even though the face is nicked or marred. Groove is included on all sizes ⅜" and larger.

Additional protection, provided by extra length Dryseal pipe threads, is especially valuable in reconnecting.

Specify Imperial Triple-Seal Flare Fittings to get all this extra protection against leakage. *They cost you no more than ordinary fittings*—and may save you from costly call backs.

Ask for Catalog 80-A

THE IMPERIAL BRASS MFG. CO.
5354 South Racine Avenue, Chicago 7, Illinois

IMPERIAL

Fittings • Valves • Filters • Driers
Floats • Charging Lines • Tools for Cutting, Flaring, Bending, Pinch-off and Swedging

Cut out all water problems!
UNICON by KRAMER
REMOTE TYPE AIR COOLED CONDENSER

Current LITERATURE available

To obtain further information on the literature listed below, please refer to key number preceding listing. Please use the "Information Center" form on "What's New" page.

Catalog Covers Burdett's Sheet Metal Facilities

——KEY NO. N-430——

CHICAGO—A new "broadview" catalog covering the sheet metal designing and producing facilities of Burdett Mfg. Co.—including ovens, heaters, air make-up units, spray booths, and washers—is just off the press.

Burdett noted that it is "perhaps best known for the pioneering of gas-fired 'Radiant Heat,' which produced savings of from 30% to 70% in heat processing as compared with conventional types of heat."

Folder Describes Treatment For Oil-Retaining Surface

——KEY NO. N-431——

STATEN ISLAND, N. Y.—"Rustshield 2," a chemical treatment that produces an oil-retaining rustproof surface for moving metal parts, is described in a new four-page publication by Outagon Process, Inc. located here.

Printed in two colors, the booklet discusses application methods and advantages of using Rustshield 2 on sliding and bearing surfaces. A great variety of precision parts and defense components are given the Rustshield treatment to meet U. S. Army Ordnance Specification 57-0-2C, Type II, Class A, and Military Specification MIL-C-16232 (Ships), Type I, the company said.

Anemostat Announces New Selection Aid Manual

——KEY NO. N-432——

NEW YORK CITY—A new 64-page Selection Manual No. 40—1952 containing comprehensive technical data for simplifying choice of proper air diffusers in air conditioning systems has been announced by Anemostat Corp. of America here.

Now in its second revised edition, the Anemostat manual contains a complete new section on Anemostat high pressure units for high pressure, high velocity systems.

Illustrated with photographs, tables, on performance data, and case examples, the manual shows how proper locations and correct number of required units are determined.

Detailed photographs and treatment of the following subjects are included:

How to select Anemostat air diffusers, types of Anemostat air diffusers, accessories, typical specifications, how to install, Anemotherm air meter, and various prices and weights.

'Why We Eat Better' Tells Story of Food Refrigeration

——KEY NO. N-433——

WASHINGTON, D. C.—A total of more than 80% of the food consumed by the average U. S. family is refrigerated somewhere in its journey from its source to the family dinner table.

This fact is graphically illustrated in a new brochure, "Why We Eat Better," being made available by the National Association of Refrigerated Warehouses.

Public refrigerated warehouses, the association says, are the key link in the chain of distribution through which perishable foods reach the family table. NARW attributes the rich, varied diet of today's average American family to scientific advances that have taken place in the refrigeration process.

An interesting feature of the brochure is a table showing, by type of product and weight, what the average American eats during each year.

Copies of "Why We Eat Better" are available on request. Requests for the brochure should be addressed to the National Association of Refrigerated Warehouses, Tower Building, Washington 5, D. C.

Sunroc Envelope Stuffers Illustrate Water Cooler Line

——KEY NO. N-434——

GLEN RIDDLE, Pa.—Four new envelope stuffers have been printed by the Sunroc Co. here to illustrate the advantages of Sunroc electric water coolers.

One folder points out the exclusive features of the Sunroc cooler with emphasis on the one-piece seamless copper tubing construction and all silver-soldered connections and joints.

The others provide specifications and enumerate features of the "Safe" models for hazardous locations, the industrial models, and the cafeteria and cafe models.

Tuthill Pump Offers Guide To Small Pump Applications

——KEY NO. N-435——

CHICAGO—A new type of reference chart on small pump applications has just been developed by Tuthill Pump Co. here.

In one table, this guide lists the various types of Tuthill pumps, the services for which each is built, the performance characteristics, types of packing, styles of mounting, and features that distinguish each model.

Connor Diffuser Catalog Gives New Engineering Data

——KEY NO. N-436——

DANBURY, Conn.—A new "Kno-Draft" adjustable air diffuser catalog (Bulletin K-20-A) has been published by the W. B. Connor Engineering Corp.

Comprising 32 pages and printed in two colors, it contains numerous revisions and additions, including temperature differential and mounting height scales, "throw" formulas to determine velocities other than standard, expanded selection curves, air entrainment ratios, static pressure and resistance charts, and simplified balancing and testing data.

M.S.A. Bulletin Describes Compressed Air-Mover

——KEY NO. N-437——

PITTSBURGH—An improved device for moving large volumes of air "quickly and economically" in situations requiring intermittent or emergency ventilation, is described in a new four-page bulletin (DP-5) published by Mine Safety Appliances Co. here.

Portable and light-weight, the instrument is described as adaptable for use in industrial plants or wherever else circumstances make it necessary to remove air contaminants from confined areas or to introduce fresh air for safe ventilation or rapid cooling.

Called the "M.S.A.-Lamb Air-Mover," the device employs compressed air or steam in its principle of operation. Horn shaped, with a bell-formed base, the Air-Mover converts pressure of compressed air or steam from any supply source into a large induced volume of moving air.

The steam or compressed air is fed through a side inlet at the bell end. Expanded at high velocity it is discharged through the outlet horn, drawing with it a large volume of the atmosphere to be moved. Depending on conditions encountered, the device can serve as a blower or an exhauster.

Initial cost of the instrument is reported to be low, compared with a motor-driven unit of the same capacity. Moreover, the company said, there is no upkeep, since the Air-Mover contains no moving parts to replace or maintain.

Three models are available: The No. 3 model, which weighs 6½ lbs., is capable of moving 800 c.f.m. with a 90-lb. line pressure supply, according to the company; the No. 6 model, weighing 31 lbs., moves as much as 3,150 c.f.m. at 70-lb. line pressure; and the No. 10 model, weighing 47 lbs., handles 5,160 c.f.m. at 80-lb. line pressure.

Problems of Air Distribution In TV Studios Outlined

——KEY NO. N-438——

ROCKFORD, Ill.—Air distribution problems in television studios are covered in a pamphlet, F-4712 published recently by the Barber-Colman Co. here.

The folder shows actual installations and describes the wide variety of air distribution equipment manufactured by the company.

Movable scenery, extremely high heat loads, and low noise level requirements can all be coped with by the Uni-Flo, Venturi-Flo, and Line-O-Flo lines, the manufacturer stated.

Permutit Co.'s Data Book on Water Conditioning Enlarged

——KEY NO. N-439——

NEW YORK CITY—A greatly enlarged edition of its water conditioning data book has been prepared by The Permutit Co. here.

This book supersedes an earlier volume produced in 1949. Brought up-to-date and completely revised, it presents a compilation of 77 tables, "all valuable to the engineer."

Among subjects covered are hydraulics, impurities in water, chemical conversions, saturated steam, boiler feedwater makeup requirements, chemicals used in water treatment, alkalinity relationships, specific gravities, and chemical reactions.

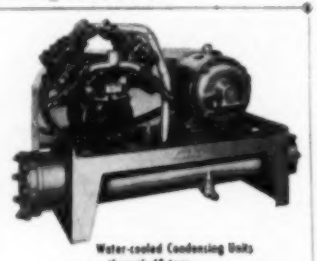
The leatherette bound volume in the 5 by 7¼-in. size contains 116 pages. It is available to practicing engineers and those who work with water conditioning problems.

Curtis

DISTRIBUTORS

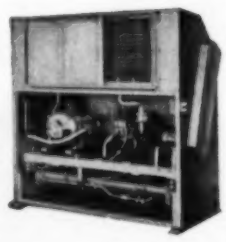
ARE MAKING MANY INSTALLATIONS

IMPORTANT TO DEFENSE



Water-cooled Condensing Units —through 40 tons

Evaporative Condensers, Cooling Towers and Air Handling Units to match



Central Type— 10-15 ton

Package Type— 2-4-6-8 ton

In . . .

- Army, Navy, Air Force Projects,
- Industrial Processing,
- Research Laboratories,
- Commissaries,
- Storage Plants— Food, Biological, Chemical

The broad CURTIS line of Air Conditioning, Temperature and Humidity Control equipment enables CURTIS distributors to quote and get many of these installations.

With Condensing Units through 40 HP . . . Evaporative Condensers, Cooling Towers and Air Handling Units to match, CURTIS distributors can handle more jobs, make greater profits.

...anchises are Open. Pin this coupon to letterhead and mail for complete information

Curtis Refrigerating Machine Division of Curtis Manufacturing Company 1913 Kienlen Avenue • St. Louis 20, Missouri

I am interested in a Direct Curtis Factory Franchise. Send complete details.

Name _____ P _____

Street _____

City _____ Zone _____ State _____

A51-8

98 Years of Successful Manufacturing Experience is "Built-In" Curtis Equipment

LIFETIME PRECISION!

Bulletin 837 Temperature Controls

Give accurate control for a long period because of their simple, rugged construction. The temperature of the surrounding air does not affect the setting. Available in different ranges between -30 F and 300 F with remote bulb and capillary, with immersion bulb, or in a room thermostat. Pilot duty rating is standard but ratings up to 1½ hp at 220 volts are also available.

ALLEN-BRADLEY CO. 1313 S. First St. Milwaukee 4, Wis.

ALLEN-BRADLEY

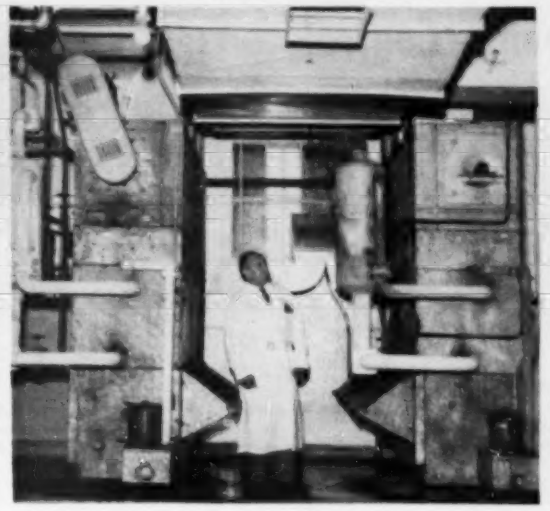
MOTOR CONTROL

AIR COOLED from ¾ to 100 H.P. !

UNICON by KRAMER

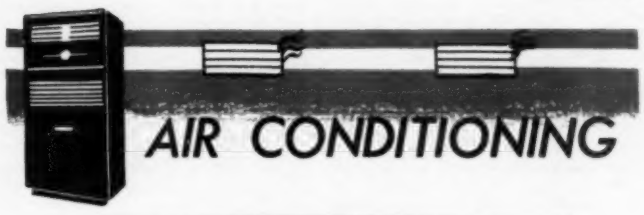
REMOTE TYPE AIR COOLED CONDENSER

INFANTS' STATION at Baptist hospital, New Orleans, is only one of many installations where air conditioning is aiding patients. New addition to the hospital will be completely cooled.



SEED STORAGE room of Reuter Seed Co. is controlled for both temperature and humidity. It is one of two such installations in the South.

BALES OF HOPS are kept under constant temperatures at Jackson Brewing Co. Extensive refrigeration and air conditioning are used throughout the processing.



Variety of Application

From Heart Patients to Premature Infants, From Seed Firms to Breweries, Air Control Is on the Job

NEW ORLEANS—Although New Orleans with its long, hot summers is a place where air conditioning is very much needed, the city offers many examples of installations which could well be duplicated practically anywhere in the country.

Take hospitals, for instance. At Charity hospital air conditioning is used in the treatment of thyroid trouble and also in cases of congestive heart trouble.

In the operating rooms it is used to remove dust from the air and to make the patient more comfortable. Since the doctor performing an operation is also more comfortable, his efficiency is increased and, in turn, the patient's chance of recovery is better.

Guards Premature Infants

An important use for controlled temperature at Charity is in the obstetrical units and in the premature infants' station. Here, the child is protected from temperature fluctuation and provided with fresh, clean air.

Altogether, the 20-floor hospital is about 10% air conditioned.

At Baptist hospital, the superintendent, Dr. Frank Tripp, considers the benefits of air conditioning obvious. It is used in all surgical rooms, in delivery rooms, and in infant quarters. In addition, some patients' rooms are equipped with window units to make patients more comfortable.

The new addition to the Baptist hospital will be completely air conditioned. This is an indication, certainly, that medical men favor controlled temperature and humidity as a means of enabling the sick to put up a better fight.

At the Touro Infirmary, too, every operating room, delivery room, and infant station is air conditioned.

Temperature Changes Slight

The Weil Convalescing Memorial, a new addition, is completely air conditioned. Dr. John C. Mackenzie, the director, says that heart patients and persons suffering from thyroid disorders are placed in air conditioned quarters as an adjunct to treatment. He advises regulation of the temperature according to the weather so there is not too great a difference between the cooled room and outside air.

Dr. George Burch at Tulane Medical school is using air conditioning in studying the influence of tropical and subtropical climate on the cardiovascular system of man. In one experimental room in the Hutchinson Memorial building, it is possible to raise the temperature to 150° F. or reduce it to freezing in a short time.

It has been found so far in this study that in a moderate temperature and humidity of about 60%, the heart seems to function easier and the blood pressure is steadier. To what extent this is due to psychological reaction is not yet determined.

May Prevent Relapse

However, Dr. Burch was able to show that a person on the verge of congestive heart failure but just returning to normal can be thrown into a relapse by hot and humid atmosphere. A heart patient should be treated constantly in air conditioned quarters, it was said.

Dr. Burch is convinced that controlled temperature and humidity increases man's efficiency. Students at Tulane, he is certain, would do more work and do it better if the entire school were air conditioned. This is advocated, also, by some other members of the faculty, but there is a lack of sufficient funds to do so.

Recently, Clay Bankston, a member of the American Society of Heating & Ventilating Engineers, did considerable research to determine the results of air conditioning in industrial plants and residences.

He reported that families who have air conditioning in their homes say they are in better health—just as they would be if they were at a summer resort. But he makes no claim that air conditioning in this case has any curative effects.

Nevertheless, he points out, the benefits of air conditioning are great. For example, the infant who has an air conditioned room sleeps better, grows more rapidly, and is in much better spirits generally—which means less wear and tear on the mother.

Home Air Conditioning— Answer to Fewer Colds?

Some families said they don't have colds since they have had air conditioning and others reported that air conditioning cured their hay fever. Although there is no way to prove they wouldn't have been free of colds and hay fever anyway, at least they like the cool, clean air so much they are anxious to give it full credit for their general well being.

More positive were Bankston's findings regarding air conditioning in manufacturing plants. The best New Orleans-made candy, cigars, and cigarettes, for instance, are manufactured with the help of air conditioning and refrigeration.

Seeds Require Close Control

In New Orleans, all seed is stored in air conditioned rooms. Small seed requires a low humidity and a temperature of 70° to prevent germination. Beans and peas (considered large seed) must be stored at 38 to 42° with low humidity to keep out weevil. If small seed could stand a temperature as low as 42°, it could be stored in the same room with peas and beans since both require the same percentage of humidity.

Reuter Seed Co. and Steckler Seed Co. at New Orleans are said to be the only such houses in the South which have air conditioning. Other seed houses use public cold storage warehouses.

New Orleans is the leading southern center of another business—the brewing of beer, which requires extensive facilities for controlling temperature and humidity. Whereas breweries at one time used a maze of coils and pipes for refrigeration, there are today simply air conditioned rooms.

Exact Temperatures for Breweries

For example, one room is maintained at an exact temperature of 32° and at a humidity favorable to fermentation; another has a temperature of 32° for pasteurizing and packaging. In other rooms bales upon bales of hops are kept at 36°.

AIRO stands for

Complete stock of Refrigeration-Air Conditioning parts and supplies.

Speedy, dependable service when you need it . . . wherever in the world you want it.

New! Sectional Catalog saves you time. Write for your FREE copy, today!

AIRO SUPPLY CO.
2727 N. Ashland Ave., Chicago 14, Ill.

MARLEY SERIES 100
NATURAL DRAFT
COOLING
TOWERS

Available for Immediate Delivery From Stocks In 24 Cities

CALL YOUR LOCAL MARLEY SALES OFFICE

Here is water cooling at absolute minimum cost! The years of trouble-free service built into all Marley Natural Draft Towers and their low first cost assure it.

They are strongly constructed of only heart quality redwood, the wood that withstands water. Louvers are slip fit into routed posts to prevent warping and permit inspection, and are sized and positioned to minimize drift loss.

The Series 100 balanced spray system, fitted with patented Marley non-clog nozzles, is the finest adaptation of basic natural draft design. This spray system means positive performance with little time or effort spent for maintenance.

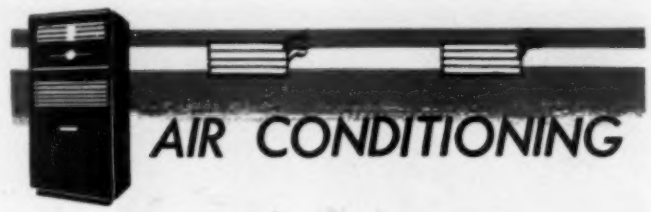
All parts of these towers are prefabricated at Marley factories for simplest construction by any available labor.

MARLEY

The Marley Company, Inc.
Kansas City 5, Missouri

Design, Use of Air Conditioning Controls

Better Operation, More Satisfaction Found When 'System Engineering' Is Used; Rapid Advance of Control Design Keeps Engineer on His Toes



Editor's Note: The important subject of controls, especially in relation to satisfactory operation of air conditioning systems, received considerable attention when the United States Air Force held its Technical Conference on Refrigeration and Air Conditioning at Bolling Air Force Base in Washington, D. C.

The discussion that follows covers some general problems in connection with controls at the headquarters of the Strategic Air Command at Omaha, Neb.

By James M. Anders, Mechanical Engineer Chief Refrigeration Unit, Headquarters, Strategic Air Command.

In the past decade tremendous strides have been made by the control industry in the development of controls and control devices. New principles of measurement involving electronics have brought with them a host of new control systems for the detection of variables and have enabled the application of these systems to every day practical problems which could previously be applied and accomplished only in the laboratory. However, two fundamental problems remain which confront the control industry and air conditioning engineers:

(1) The design of control instruments and their application in control systems in the best possible way, and

(2) The design of "controlled systems" in such a manner as to take full advantage of the automatic control devices.

The first problem belongs to the control industry which has thus far performed its part well. The second is a problem for the air conditioning engineer and involves the responsibility of providing "system engineering," that is, engineering the entire system from an over-all standpoint, including the control instrumentation and balancing of the various pieces of equipment in the controlled system in such a manner as to respond to the action of the controls.

A system cannot be successful until it has been "system engineered," and the air conditioning engineer cannot perform his job well until he understands the basic science of controls and their application.

Basic Control Theory

The primary purpose of a controlled air conditioning system is to provide a constant desired condition within a given space, compensating for the varying conditions within or without that space that may affect these desired conditions. A controlled system, regardless of mode of control or application of basic equipment, that does not maintain the desired condition is a failure and will not give satisfactory performance.

Any control system must provide an over or under controlled variable in an attempt to maintain the desired conditions, or the set point of the controllers, because the control point must deviate from the set point in order that the controlled system may function.

Fig. 1 is a comparison of desired and undesired control variables. In a simple two-position controller with a fixed differential, over and under conditions must vary the full range of the differential before the system is either started or stopped, whichever may be required. This control system causes an over and under shooting at the controller because of the total lag in the control and controlled systems and is illustrated in Fig. 1a.

The desired maximum over or under conditions at the controller is illustrated in Fig. 1b, the ultimate being a straight line coinciding with the set point.

This indicates that in order to maintain the desired set point, the controlled system must respond to the deviation at the controller in such a manner as to provide over or under conditions to the space in exactly the same proportions as the controlled variable is varying from the set point.

As an example of the above, an analysis of a temperature controller (thermostat) is made for the sensible cooling of a space. In analyzing the cycle of a thermostat, it is seen that the control point must vary if the thermostat sensing element is to heat or cool at varying rates necessary to provide for varying load conditions. As the outside air temperature increases, the rate of heat gain to the space increases and the controlled system must remove this heat at a higher rate than before.

This means that the control point must deviate from the set point in proportion to the increased rate of heat gain. Conversely, as the outside air temperature decreases the control point must deviate from the set point in proportion to the decreased rate of heat gain.

This deviation of the control point from the set point is known as "offset," and in proportional or modulating control systems varies as the load conditions vary.

For the control system to be able to maintain the desired controlled

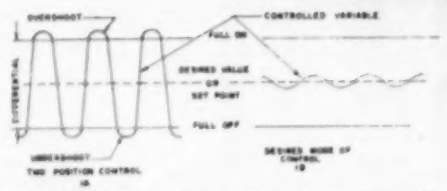


FIG. 1a and 1b—Comparison of variations in controlled variable.

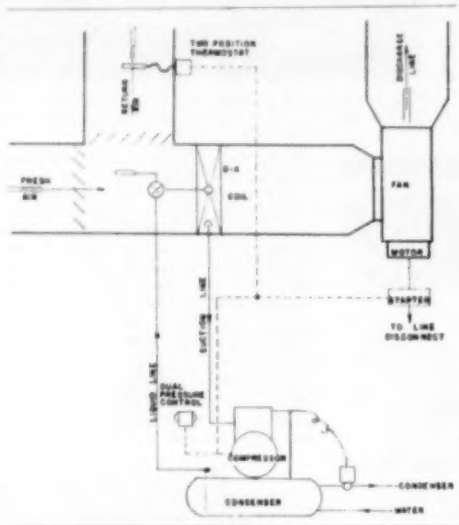


FIG. 2—Two-position control system.

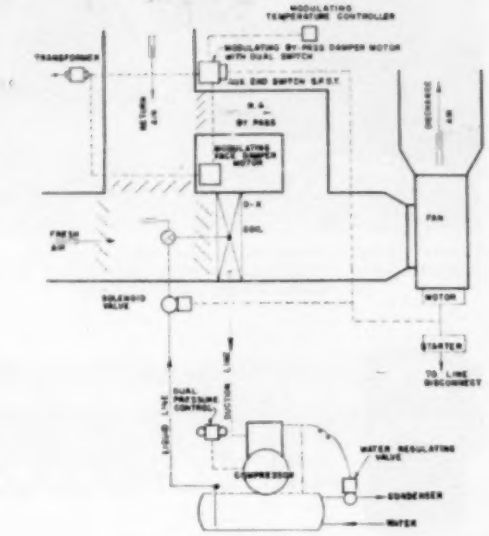


FIG. 3—Return air by-pass system.

variable, as indicated above, it is necessary that the engineer design the controlled system such that the control system can successfully operate the various pieces of equipment involved in the action. The best of control systems cannot correct an unsatisfactory controlled variable unless the controlled equipment is designed and installed so that the over-all system will respond to control action.

For proper design of the controlled system, the engineer must know the characteristics of each piece of equipment that makes up the system and must also be able to predict the lag, or amount of time required for the system to respond to control action.

To be able to intelligently select the applicable control system and control devices, the engineer must know as much as possible about the characteristics of the air mass handled and amount of ductwork involved, heat transfer surfaces (coils), chilling and/or heating mediums, condensing equipment, psychrometrics of air, sensible and latent heat load ratios (both internal and total loads), apparatus dewpoint, and the degree of sensitivity of these items to variations in the controlled variable.

Two-Position Control

Fig. 2 shows a simple two-position control for an air conditioning system. Many "standard" packaged air conditioning units are controlled in this manner today. The control system generally consists of a manual "Off" - "Fan" - "On" switch, a snap (two-position) thermostat, and the normal safety controls provided on a condensing unit.

There is no provision for the control of humidity in the controlled variable. This portion of the air conditioning system is left to wander as it will, dependent only on the humidity in the controlled variable. This portion of the air conditioning system is left to wander as it will, dependent only on the humidity condition that is obtained as a result of the coil entering air conditions, coil surface, suction temperature of the refrigerant gas and the ratio of the internal sensible and latent loads. Temperature control is almost as poor as the humidity control.

As the rate of heat gain (sensible only) increases the compresor is started when the high point of the differential is reached and the compressor (or system) remains on until the thermostat is cooled to the low point of the thermostat differential. This results in both over and under sensible cooling of the space and at the same time causes an accompanying over and under relative humidity condition of the space.

It is readily seen that the humidity cannot be controlled in a system of this type without modification to the controlled equipment. The simple addition of a humidistat to this system would accomplish nothing, there being no medium for the humidistat to control. The thermostat produces a cycling condition as shown in Fig. 1a, which is not satisfactory to the occupants of the conditioned space, nor should it be satisfactory to the engineers or manufacturers of the system.

By-Pass Control

Fig. 3 shows a return air by-pass system of air conditioning and is a combination of proportional control and two-position control. As the face and by-pass dampers are modulated, the solenoid valve is fully opened or closed and the compressor is fully on or off, depending on the suction pressure. This system will afford an amount of humidity control with an accompanying temperature control approaching the desired controlled variable curve shown in Fig. 1b.

However, the amount of humidity control is still dependent upon the coil surface, refrigerant suction temperature, and the amount of air passing through the coil at any one instant.

An analysis of the system as shown indicates that as the rate of heat gain increases, the thermostat will close the by-pass dampers, open the face dampers, and allow the solenoid valve to open which will permit the suction pressure to rise and the compressor to be full on. The reverse of this takes place on a decrease in the rate of heat gain.

An analysis of the system during normal operation indicates that, as the rate of heat gain varies, the face and by-pass damper will modulate toward the fully open or closed positions as is required by the load. As the by-pass dampers are opened, the face dampers reduce the amount of air moving across the coil and the characteristics of the coil cause a reduction in the leaving air temperature, thus reducing the dewpoint further and removing additional moisture from the amount of air moving through the coil.

When this air is mixed with the return air at the fan inlet, the wet cold air off the coil absorbs moisture and heat from the return air and admits cool, dry air to the conditioned space. Unlike the two-position control system shown in Fig. 2, positive humidity control can be added to this control system with very little modification.

With the addition of variable capacity control to the compressor, a humidistat can be placed directly beside the thermostat and control the suction temperature of the compressor, or a modulating pilot control can be installed on the expansion valve in such a manner as to control the leaving air temperature off the coil, as shown in Fig. 4. The use of these controls on this system will prevent over dehumidification within the space and will allow both humidity and temperature to be maintained closer to the set point of the respective controllers.

This type of controlled system cannot be made to operate completely satisfactorily where the ratio of the latent heat load to the sensible heat load is relatively high as in warm moist climates, or where large numbers of people congregate in an inclosed space where the sensible heat gain is comparatively small. It is best to not use this system when the apparatus dewpoint cannot be obtained from the latent and sensible heat ratios or where reheating is required for all load conditions.

One variation of this system would include split coils or multiple coils with a solenoid valve to each coil which would be closed as the face dampers close.

Reheat Control System

Fig. 5 is a diagram of a hot condenser water reheat system utilizing a proportional position control system. The control system illustrated provides for the control of both humidity and temperature. If compensation is provided for the total lag of the control and controlled systems, the controlled variable curve will approach nearer the desired curve illustrated in Fig. 1b than any control system previously discussed.

The function of this control system is as follows: as the humidity rises the humidistat actuates the modulating pilot control causing the expansion valve to open and admit refrigerant to the coil. Should the room temperature begin to drop as a result of the humidistat action, the reheat thermostat will actuate the

(Concluded on next page)

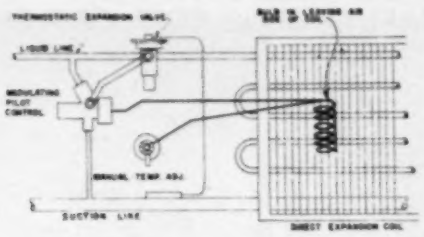


FIG. 4—Modulating pilot control application.

Electronics Provide Tools for Engineer

(Concluded from preceding page)

three-way valve in the hot condenser water line to divert hot water to the reheat coil which in turn raises the room temperature back to the set point. This same action takes place in reverse on humidity drop in the controlled space.

The cooling thermostat is a limiting device which prevents overheating of the space should the humidistat become satisfied. It should be of a two-position operation of the same voltage characteristics as the modulating humidistat, and should be wired in parallel with the humidistat in such a manner as to cause the modulating pilot control to permit full operating capacity of the cooling coils. The reheat control system will prevent any tendency of the cooling thermostat to cause sub-cooling of the space.

Constant water supply and temperature to the reheat coil is maintained by controlling the amount of water over the cooling tower. The cooling tower by-pass valve is controlled by the modulating head pressure controller and causes the water flow over the tower to be reduced as head pressure is reduced, permitting the pump and condenser to handle a constant amount of water at varying inlet temperatures but at a constant leaving temperature, thus providing a constant water supply and temperature at the reheat coil.

The plug cock and by-pass around the three-way mixing valve is to balance the water flow so that the three-way valve can be sized to handle only the water required by the reheat coil rather than the total water circulated in the system. Compressor capacity is controlled by a suction pressure control through the capacity reduction device.

Special care must be exercised in making the controlled system application to this type of control system. The entire system, both control and controlled, must be "system engineered." It is especially necessary to balance the high side equipment with the low side equipment and to know the reduced capacity relations between the two, if the system is to be expected to perform satisfactorily.

The compressor must have multiple steps of capacity reduction in order to follow the load requirements placed on it by the action of the modulating pilot control. Proper balancing of the system minimizes cycling, or hunting, of the system for a load balance point.

Electronic Control Application

Fig. 6 is a functional control diagram of the summer operation cycle of an electronic control system in combination with a proportional-positioning control system and is now in operation at an installation in the Headquarters of the Strategic Air Command, Omaha, Neb.

The air conditioning system is for year-round conditions and is installed in a space that required cooling during all seasons of the year. Heating coils are provided in the air handling unit but are omitted for purposes of clarity of this paper.

The system consists of a 50-hp. Chrysler Airtemp compressor, a nominal 60-ton UsAirco evaporative condenser, 6-row UsAirco D-X coils, an American Blower size 440 Sirroco fan, one zone air distribution system utilizing Agitair diffusers, and Minneapolis-Honeywell controls.

The basic principle of an electronic control system is that a change in the resistance of the controller will cause a resultant increase or decrease of potential in the electrical circuit. This minute change in potential is picked up by the electronic relay, is amplified and causes the controlled system to react in such a manner as to bring the controller resistance back into balance.

In this application, the thermostat is the primary control element, the outside air controller and discharge air controller elements being secondary. The electronic panel is a controller mechanism and serves as a collecting machine for the various reactions of the controllers to changes in room and outside conditions which affect the desired conditions to be maintained.

The modulating pilot control, as previously explained, controls the leaving air conditions off the coils and is utilized to affect the humidity conditions of the space. As the room temperature deviates from the set point, the resistance of the thermostat element changes and is reflected in the panel to drive the damper motor in the indicated direction.

If the change is slight, and the conditions at the two secondary controllers remain in a reasonably steady state, the change is accomplished as rapidly as the system lag will permit the return of the control system to an electrical resistance balance, and the control point back to the set point.

Should the rate of internal heat gain increase rapidly, the thermostat would call for full cooling operation and the discharge air controller would resist this rapid change in discharge conditions which would allow the thermostat time to resample the room temperature and readjust itself to the new room condition. This would tend to increase the system lag and retard the action of the controlled systems in such a manner as to not permit the over shooting of the throttling range of the control system and start the system to cycling or hunting. This in turn would not allow a rapid change in effective temperature.

The foregoing is predicated on the outside conditions remaining in a relative stable condition.

The reverse of this cycle occurs on a sudden decrease of internal heat gain. Should an increase in rate of heat gain from the outside conditions occur, the outside controller would change its resistance and upset the balance at the electronic panel and thus try to increase the output of the controlled system to compensate for the increased rate of heat gain. This action in turn, would be resisted by both the thermostat and the discharge air controller which would try to keep the control system in balance and again would not permit an over or under shooting condition on the effective temperature.

The amount of authority, or percentage of authority, of the outside and discharge air controllers can be adjusted at the electronic panel to obtain the amount of pick-up or lag desired in the controlled system. The remaining portion of the system is controlled as described under the discussion of "By-Pass Control."

Conclusions

The ultimate has not yet been attained in the development of controls and control devices, but the control industry, by its continued research, is making advancements so rapid that it is difficult for control engineers to keep pace. The development of proportional positioning and electronic control devices has been a tremendous step in providing the engineer with tools.

Definitions

Final Control Element: That device or mechanism which is actuated by the control system in such a manner as to change the control agent.

Control Agent: The medium on which the final control element acts to maintain the desired value of the controlled variable.

Control Point: The value of the controlled variable which the controller operates to maintain.

Set Point: The value on the controller scale at which the controller indicator is set.

Differential: The smallest range through which the controlled variable must pass in order to move the final control element from the maximum to minimum position. This term is applied only to two-position controllers.

Proportional Band (Throttling Range, Modulating Range): The range of values of the controller (proportional) through which the controlled variable must pass to move the final control element (proportional) through its full operating range.

Cycling: A periodic change in the controlled variable from one value to another. Commonly called "hunting."

Offset: A sustained deviation between the value of the controlled variable corresponding to the set point and the control point.

Lag: A delay in response in the controlled system to a deviation from the control point at the controller.

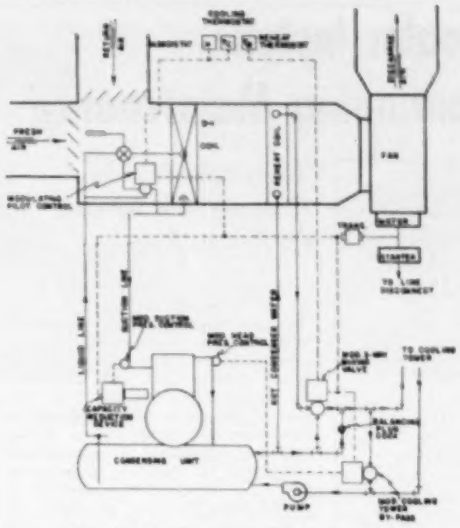


FIG. 5—Hot condenser water reheat system.

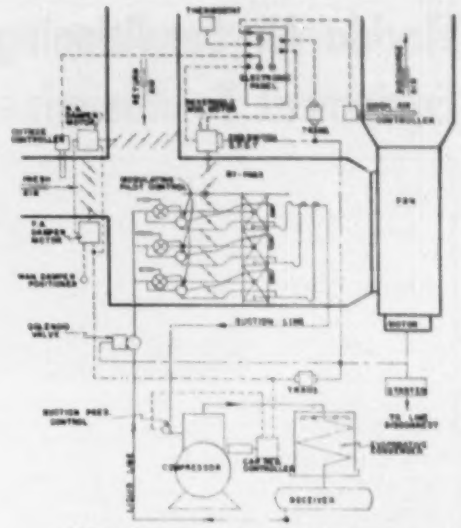
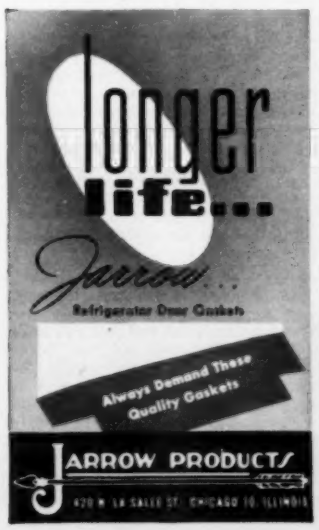


FIG. 6—Face and by-pass electronic control.



THE PICK OF THE PACKERS

Out where the West *ends* . . . many of the great meat packers use Worthington *refrigeration* machinery.

And all over the country, many famous *restaurants*—Toffenetti's in Times Square, Silver Fox Restaurant in Washington, The Century Room, Dallas—use Worthington *air conditioning* machinery.

This acceptance of Worthington equipment is one of your biggest assets as a Worthington distributor—a powerful tool for your salesmen. Prospects are always impressed by "big names", especially if they represent the leaders in their particular field.

As a Worthington distributor you can handle *any* job with exactly the right equipment—because the Worthington line is the broadest line.

Worthington Pump and Machinery Corporation, Air Conditioning and Refrigeration Division, Harrison, New Jersey.

WORTHINGTON

A-2.17

AIR CONDITIONING AND REFRIGERATION

A Balanced Line...A Balanced Franchise

Florida Air Conditioning Dealer Installs Equipment To Minimize Continuing Maintenance

JOB RECORD

NAME

ADDRESS

PERSON IN CHARGE

AIR UNIT — R.P.M. — Volts

Belts — Quantity — Size

Fan Motor — HP — Pulley — Heaters

Fan — Pulley — Filters — No. — Size

COMP. MOTOR — R.P.M. — Volts

Belts — No. — Size — Heaters

EXP. VALVE

MISC.

3 Contracts Provide Customer with Amount Of Service Required

MIAMI, Fla.—Giving consideration to the problems of the customer's particular business from the standpoint of continuing maintenance service, is the success key used by Stuart Cooling Corp. here. This service consideration includes three important points of study: access to equipment for quick service during business operation; placement of equipment to minimize disturbance and noise; location of equipment to provide maximum use of space.

Five years ago this company, with Armand Cowan, president and Herbert D. Fink, secretary, opened its air conditioning operation. Since then it has sold and installed over 200 major air conditioning units, including hotels, restaurants and office buildings. Nine of these were housed in poured concrete cooling towers which were developed by Stuart's, as an integral part of the architectural design in new construction. (Frame or metal towers often used in other parts of the country afford insufficient resistance to hurricane stresses in Florida.) In existing construction, the concrete method is impossible, of course. More than one-third of the 200 installations were made in 1951 and 75% of them take the sustained maintenance service.

THREE CONTRACTS OFFERED

One of three contract maintenance plans may be selected by a customer. The first plan is monthly maintenance; the second is monthly maintenance plus emergency service; and the third plan adds a rust-retarding service. These plans assure the customer peak efficiency from his equipment at an average cost below that on an emergency call basis.

When a mechanic is dispatched on a monthly maintenance call, he carries a check list covering 48 steps. He goes through each of the steps, paying particular heed to certain items which apply to that installation.

Here's a dry run through the list:

COMPRESSOR

1. Compressor motor is lubricated as required. 2. Compressor oil level is checked in sight glass and refrigerant oil added as required. 3, 4 and 5. Mechanic reads and records head pressure, suction pressure and oil pressure. Remedial steps are taken if any abnormalities appear.

6. System is pumped down to ascertain that the low pressure stat will shut the system off at proper pressure. Compressor is also operated without the condenser to determine that the high pressure cutout stops compressor at proper temperature.

7. Compressor bolts are checked and tightened at six month intervals unless some very evident indication is seen that it is required earlier. 8. Refrigerant is checked in sight glass and added if required.

9. Job leak tests are made at the seal, at flare connections, and at any other point of known leakage. Rechecks at each inspection if there is indication of refrigerant loss. 10. Rotation is checked. 11. Compressor belts are checked for proper tension and alignment.

CONDENSER OR TOWER

12, 13, and 14. Pump and fan motor, evaporative condenser, and cooling tower are properly lubricated, as well as the pump and fan. 15. At six month intervals, condensing coil is checked for chemical deposits, scale or dirt, and removed if found. 16. Water spray nozzles are checked at each call. They are cleaned if it is found that they are clogged.

17, 18, and 19. Strainer screens for city water make-up, pump intake, and outside air intake are checked and cleaned. 20. The make-up float control is checked to ascertain that proper water level is maintained.

21. All water connections to the unit are checked for leaks. 22 and 24. Condenser belts are checked, and aligned and tightened if required. 23. Rotation of fan is checked upon the first call, or on any call after electric changes have occurred in the building. 25. Entire units is examined for rust. The report submitted is later followed up by a mechanic whose only duty is rust retarding. 26 and 27. Mechanic checks water softener container.

CONDENSER (WATER COOLED)

28. Water regulating valve is adjusted whenever required.

CONDENSER (AIR COOLED)

29. At 90-day intervals the air-cooled condenser is cleaned.

AIR UNIT

30, 31, and 32. Fan and fan motor bearings of air unit are lubricated. Belt condition, tension and alignment are checked. 33. Replaceable type filters are changed and renewable filters cleaned. 34. Blower wheel fan alignment is checked and corrected.

35. Refrigerant strainer is checked and cleaned if required. 36. All water connections are checked for leaks. 37. A complete report on rust is submitted, together with item 25 and attended to at the same time. 38. Condenser drain line is blown out.

CONTROLS

39, 40, and 41. Thermostat, starter, damper motors, and other electrical installations are checked for proper operation. 42. Damper settings are marked on the ducts and a mechanic checks that the settings have not been altered or quadrants loosened. Dampers are reset when necessary.

WELL WATER JOBS

43 and 44. On the few well water jobs, the pump and pump motor are lubricated and air is purged by means of a pet-cock.

GENERAL

45. Manager of the place of business is instructed in the operation and installation on the first call after a change of management. 46. If any changes are made to the system, the manager is fully informed. 47. If door decals are deteriorated, they are scraped off and replaced. Prominently placed at the entrance, such decals advertise "Air Conditioned by Stuart." 48. Entire system is wiped clean with rags.

(Concluded on next page)

STUART COOLING CORP. OF FLORIDA

MONTHLY MAINTENANCE CHECK LIST

JOB: ..... Date: .....

COMPRESSOR

1. Lubricate motor bearings
2. Check oil level
3. Check head pressure ..... lbs.
4. Check suction pressure ..... lbs.
5. Check oil pressure ..... lbs.
6. Check pressurestat oper.
7. Check head bolts
8. Check refrigerant
9. Test for leaks
10. Check rotation
11. Align & tighten belts

EVAP. COND. OR TOWER

12. Lubricate motor bearings
13. Lubricate fan bearings
14. Lubricate pump bearings
15. Check coil (scale or dirt)
16. Check spray nozzles
17. Check water strainer (make-up)
18. Check pump strainer
19. Check air intake screen
20. Check float control
21. Check drip. pan & drain conn.
22. Check drive belts
23. Check rotation of fan
24. Align & tighten belts
25. Rust (casing & pan) report
26. Micromet container
27. Micromet added

CONDENSER (Water Cooled)

28. Check water reg. valve

CONDENSER (Air Cooled)

29. Clean condensing coil

AIR UNIT

30. Lubricate motor bearings
31. Lubricate fan bearings
32. Check drive belts
33. Check filters
34. Check fan wheel alignment
35. Check strainer
36. Check drip pan & drain conn.
37. Rust (casing & pan) report
38. Blow out cond. drain line

CONTROLS

39. Check thermostat operation
40. Check starter operation
41. Check damper motors
42. Check damper settings

WELL WATER JOBS

43. Lubricate pumps
44. Purge air from lines

GENERAL

45. Instruct manager in oper.
46. Inform manager of changes
47. Check with gr. re decals
48. Wipe all dirty parts
49. Get signed ticket for time & materials used

MECHANIC, PLEASE NOTE:

When completed, all items are to be checked, either with a ✓ to indicate work has been attended to, or an ✗ to indicate item does not apply to this installation. This check sheet to be attached to signed service ticket and returned to Stuart at end of day.

STANDARD EQUIPMENT TO BE CARRIED BY MECHANIC: Mirror, Zerk gun and grease, flexible spout oil can, S.A.E. 20 oil, Capella oil, gauges, leak detector, hand tools, rags, chalk, micromet, jack.
MECHANIC'S REMARKS: Have you found evidence of rust?

Have you circled and dated rust spots?
Additional remarks (use other side of sheet, if necessary) .....

Signed by—
.....
Mechanic

JOB NO. _____ INVOICE NO. _____

STUART COOLING CORP. OF FLORIDA

19 _____

SERVICE TO _____

ADDRESS _____

BILL TO _____

SERVICE RENDERED _____

If This Space Is Insufficient Continue On Other Side

Material Used	Price	C.O.D. | Charge	No Charge
		Total Material	
		( ) Hrs. travel	
		( ) Arrived at	
		( ) Departed at	
		Total Charge	

Job Completed ☐ Job Incomplete ☐

Serviceman's Signature _____

We are not responsible for parts other than those furnished and installed by STUART COOLING CORP. OF FLORIDA.

Guarantee on all parts are limited to the guarantees given by the manufacturer to STUART COOLING CORP. OF FLORIDA.

No Verbal Agreements Will Be Recognized

The above described service and installation of parts listed has been authorized and hereby acknowledged. Equipment now operating satisfactorily.

CUSTOMER _____ BY _____

POSITION _____ DATE _____

Work order tickets (above) are padded in book form and numbered in duplicate. Customer keeps original and duplicate goes to the shop.

the Moisture Monster SELLS for YOU... ...IN POWERFUL OASIS ADVERTISING!

Your customers are reading about the Moisture Monster this year—in Better Homes & Gardens . . . House Beautiful . . . House & Garden. He's driving home the fact that moisture rusts metals . . . causes mold and mildew . . . ruins woodwork, clothing and leather. He's a salesman for *you*, "selling" *your* customers in their living rooms, as they read their favorite magazines!

He works on your sales floor, too!

Oasis provides a big "Moisture Monster" floor or counter display that ties *you* into the big Oasis "Moisture Monster" national advertising, and reminds prospects to ask about the Oasis Air Drier. And of course there are "Moisture Monster" newspaper mats, direct mail, and other features of a complete Oasis sales promotion plan that *sells*. How *well* does it sell? *Oasis dealers close 9 out of 10 demonstrations!*

Air drier sales in 1951 *doubled* 1949—and '52 sales are going even better! Get yourself a big share of this profitable air drier business—write for details on Oasis Air Driers and the Oasis sales promotion plan . . . NOW!

OASIS Air Drier

ELECTRIC DEHUMIDIFIER

Made by the World's Largest Manufacturer of Electric Drinking Water Coolers

COPYRIGHT 1952 THE EBCO MFG. CO.

Get all the facts about the profit-making OASIS proposition—

MAIL THIS COUPON TODAY!

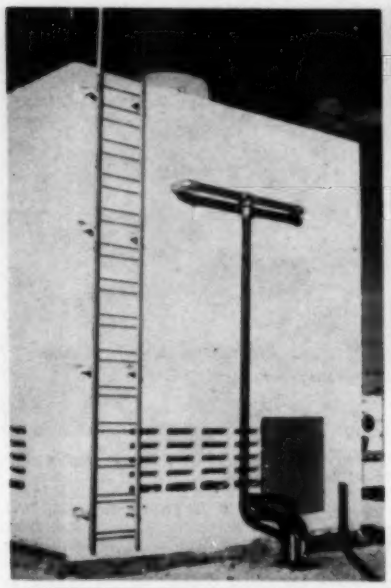
THE EBCO MANUFACTURING CO.
404 W. Town Street, Columbus 8, Ohio

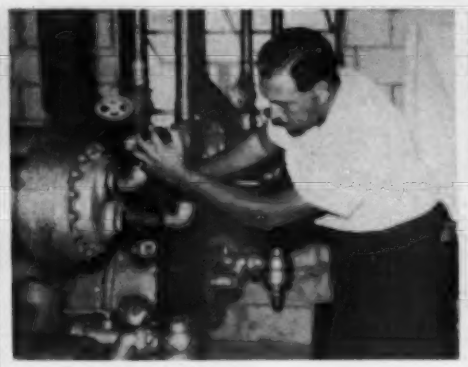
Give me the facts on the money-making Oasis proposition.

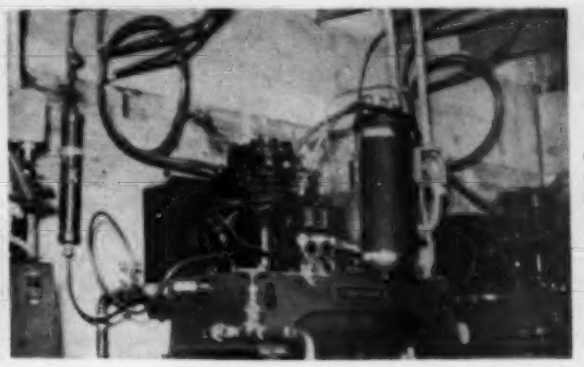
NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____







AIR CONDITIONING unit installed at Fan and Bill's restaurant, Miami Beach, Fla.

ABOVE: Armand Cowan, president, Stuart Cooling Corp., performs one of the operations in the company's monthly maintenance check.

LEFT: Concrete tower, designed by Stuart Cooling Corp. as an integral part of Miami Beach Revere hotel design.

MAINTENANCE AGREEMENT

Stuart hereby agrees to furnish and Purchaser hereby agrees to pay for inspection, maintenance, rust retarding, and service subject to the following conditions, for the equipment only, located at the aforementioned premises.

The equipment covered by this agreement includes the following compressors and mechanical systems of which they are a part. Ductwork, plumbing, wiring, insulation, or any other work that is not an integral part of the refrigeration cycle is not included.

Stuart agrees to make ..... inspections each year, and at time of inspection, to perform the normal services listed below:

1. Inspect equipment for refrigerant leaks.
2. Repair all leaks in refrigerant mains.
3. Clean commutators on motors.
4. Clean all motor housings.
5. Clean condenser annually on water-cooled systems.
6. Clean lint and dirt from air-cooled condensers.
7. Clean condensing units.
8. Clean all strainers.
9. Adjust tension on all belts.
10. Lubricate all moving parts.
11. Check operating pressures of condensing units.
12. Purge air from systems.
13. Check refrigerant in systems.
14. Charge refrigerant into systems as necessary.
15. Inspect and adjust temperature controls.
16. Inspect and adjust safety controls.
17. Inspect and adjust all valves.
18. Adjust water regulating valves.
19. Check operation of refrigerant controls.
20. Supply emergency service between regular inspections.

And on air conditioning systems to:

1. Clean steam traps or electric heaters.
2. Check and adjust dampers and air distribution.
3. Change over and set controls for seasonal operation.
4. Inspect air filters.
5. Clean evaporative condensers or cooling towers.
6. Clean drip pans.

Rust Retarding:

1. Examine all parts at intervals not exceeding six months.
2. Where rust is found, chip, scrape, and wire brush same until bare dry shiny metal is discernible.
3. If this surface is not in constant contact with water, apply zinc chromate or red lead.
4. If this surface is in contact with water, apply heavy coating of bitumastic paint or hot pitch.
5. After application, 3 or 4, as required, paint entire surface with aluminum paint.

It is assumed that, at the time that this agreement is entered into, all machinery is in proper operating condition. However, the following equipment is not in proper condition for reasons mentioned below, and any service necessitated by these items shall be charged for at our regular billing rates until such time as these deficiencies are corrected . . . .

Stuart agrees to furnish the following materials as and when necessary:

1. Necessary lubricant (oil or grease) for fan and motor bearings.
2. Necessary fuses.

It is mutually agreed:

1. That Stuart shall not be required to furnish replacement parts, refrigerant and supplies other than those listed above, or to repair damage to the equipment due to causes beyond our control. Additional materials will be furnished by us at our regular selling prices, less 10 per cent.
2. All work to be performed during Stuart's regular working hours of regular working days. If, for any reason, Purchaser requests that examinations or adjustments be made on overtime, Purchaser agrees to pay the difference between regular and overtime labor at regular billing rates.
3. Any additions, alterations, adjustments, or repairs made by others, unless authorized by Stuart, shall terminate Stuart's obligations hereunder. Stuart is not obligated to assume the charges or to make a refund to the Purchaser for any service work performed, or for any material furnished by persons other than Stuart.
4. Any repairs, refrigerant, and supplies other than those listed above deemed necessary and recommended by Stuart for efficient operation of Purchaser's installations are to be authorized by Purchaser. Unless these recommendations are accepted by Purchaser and authorization given to perform this service, Stuart will not furnish emergency service. The Purchaser shall accept the judgment of Stuart as final as to the means and methods to be employed for any corrective work.
5. In the event Stuart is required to make emergency calls occasioned by the improper operation of the equipment or due to damage caused by floods, lightning, fire, elements, rebellion, riots, strikes, labor troubles, civil commotion of any kind, or due to Purchaser's failure to follow Stuart's recommendations as noted in Item 4, or for any causes beyond Stuart's control, Purchaser shall reimburse Stuart for the expense incurred in making the emergency call in question, in accordance with the current established rates for performing such service.
6. Stuart shall not be liable for the operation of the equipment nor for injuries to persons or damages to property, except those directly due to the negligent actions or omissions of Stuart's employes. Stuart shall not be held liable for any loss or damage due to delay in furnishing labor or material for any cause beyond Stuart's reasonable control, and in any event Stuart shall not be liable for any consequential damage.
7. The amount of any past or future sales, use, service, excise, or other similar tax, Federal, State, or Municipal which Stuart shall now, or hereafter be liable for, or required to pay, either on Stuart's or Purchaser's behalf or otherwise, with respect to Stuart's obligation to furnish services and supplies hereunder, shall be in addition to the sum payable by Purchaser under this proposal and shall be paid by Purchaser upon the rendition of separate invoices covering such tax.
8. Any violation on the part of the purchaser of any of the terms of this agreement, or non-payment of bills rendered in relation to this agreement within 30 days of invoicing, shall be sufficient cause for Stuart to be relieved of their responsibility under this agreement and to cancel same without notice. In case suit shall be brought for collection of bills in relation to this agreement or same has to be collected upon demand of an attorney, purchaser agrees to pay reasonable attorney's fee for making such collection.

This agreement shall remain in effect for one year from date of signing and shall continue from year to year thereafter, at an increase of 10% each year, unless thirty (30) days prior to the termination of any yearly period, either party gives written notice to the other of their intention to terminate same.

This agreement is signed in duplicate this ..... day of ..... and constitutes the entire contract between us. All prior representations or agreements not incorporated herein are superseded.

Maintenance Contracts--

(Concluded from preceding page)

The 49th point is a reminder to the mechanic. He has the work order ticket signed by the customer. This is a receipt that the work has been accomplished. This work order he returns, with the maintenance check and any necessary additional remarks, all signed, to the company office.

(Work order tickets are padded in book form in numerical sequence, in duplicate. The customer keeps the original and the duplicate is returned to the service manager. Both are signed by the customer and mechanic, showing time spent and materials used on the job.)

Upon starting a system, the mechanic in charge fills out the job record card so that the shop has a record of all parts that might be required to keep this system functioning properly. From such a card, the company immediately stocks items that need frequent replacement, so that an installation can be serviced on a minute's notice—any hour.

A service card is posted on the job and is kept current by the mechanic at each visit. Any new mechanic visiting the job can, on consulting the card, determine where, when, and what kind of trouble had been encountered before. Diagnosing the trouble with a resultant loss in time is eliminated.

Stuart Cooling maintains an emergency service 24 hours a day, 7 days a week. Mechanics are in constant contact with the office. They call in at the completion of a job, prior to lunch, before quitting time, and before starting any overtime. A stock of spare parts is carried in a well-equipped service truck which eliminates much traffic.

When the duplicate work order ticket is returned to the service manager, he checks the ticket against the dispatch sheet, then forwards it to the stock man. Inventory changes are recorded and the ticket forwarded to the accounting department.

Monthly bills are made up directly from the work order ticket and mailed to the customer. A perpetual inventory is maintained of parts and tools in the shop and in the car stocks.

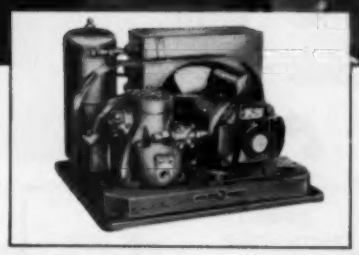
As items are removed from car stock or inventory, they are recorded on the work order ticket and on an inventory sheet by the stock man. As parts are delivered to the shop from the supply houses, they are checked against the invoice by the stock man. Additions to inventory are then recorded on the inventory sheet. This inventory sheet is submitted to the accounting department weekly so that the master inventory record is kept current.

These completely stocked trucks, trained mechanics, and service dispatchers on 24-hour duty provide mobility and a maintenance service that is good publicity.

"General Electric Condensing Units mean satisfied customers and more business for me."

W. O. Watson

President, Fountain & Fixture Company
2416 Caroline Street, Dallas, Texas



THE OFFICE GRILLE IN DALLAS, one of Mr. Watson's many satisfied customers, draws its clientele from nearby offices and department stores. Its full menu of excellent sandwiches and complete lunches requires faultless performance of refrigeration equipment. Shown above with Mr. Watson are George L. Athens, owner, and Carl Forman, manager. In addition to the Office Grille, Mr. Athens operates three cafeterias in Texas that are also served by G-E units.

In this installation, Mr. Watson used three G-E units: ¾ and 1 hp open type and ½ hp hermetic. Since he usually installs fixtures custom-made by his own company, the performance of the equipment is important to him. Regarding G-E units, he says, "I like them because they give dependable, trouble-free service."

GE CONDENSING UNITS

EASY TO BUY!
EASY TO SELL!
EASY TO INSTALL!

FREE DATA ON G-E SEALED AND OPEN UNITS

General Electric Company, Section AC-5
Air Conditioning Division, Bloomfield, N. J.

Tell me the location of the G-E Parts Depot nearest me ☐
Please send me literature on G-E Open Units ☐
G-E Hermetics ☐ G-E Renewal Parts ☐

NAME .....
ADDRESS .....
CITY ..... ZONE ..... STATE .....

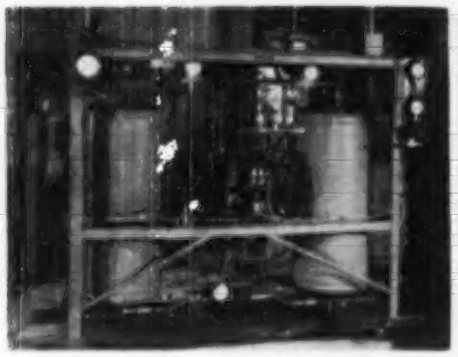
You can put your confidence in—

GENERAL ELECTRIC

No Compressor too large to be Air Cooled!

UNICON by KRAMER

REMOTE TYPE AIR COOLED CONDENSER



HEAT PUMP at Mucke & Sons, Hartford, consists of a packaged unit with two 3-hp. water-cooled compressors. Beside the compressors are two 80-gal. tanks which act as heat interchanger and surge tank.

SOME 500 ft. of copper tubing is laid under the basement floor to provide radiant heating. Installation will deliver 40 B.t.u. per linear foot per hour by direct condensing of "Freon-12."

SAUSAGE COOLER is an insulated room 25 x 35 ft. with four circular cooling units suspended from the ceiling.

Sausage and the Heat Pump

Charles Charlton Produces Another 'Link' In Commercial Development of This Double-Cycle Machine

By H. E. Voegeli, Development Engineer, The American Brass Co.

Not until about five years ago was serious thought given to the possibility of utilizing both the hot and cold output of a refrigerating machine simultaneously, or at least for the performance of two useful services from a single machine. This thought emanated from the inventive minds of engineers and scientists in various parts of the country at about the same time, it having been born in a period while housing was of uppermost concern to all people at the conclusion of World War II.

Most naturally this thought became directed toward the study of year-round comfort conditioning for the home. In that application it has now progressed to the point where there are several concerns who are ready and able to install a heat pump for year-round comfort-conditioning in nearly every part of the country.

Ready To Earn Its Way

There are those among us who feel that the heat pump can already earn its way, and can develop fastest in commercial and industrial applications. This was demonstrated to be quite true in work that has been done within the last few years by Charles Charlton, refrigeration engineer and contractor, Hartford, Conn.

Charlton was probably the first to use the earth below the basement floor of a supermarket as a heat sink or condenser, and he is probably the first to prove in a practical way that heat of a temperature that is suitable for heating can be economically stored for days—probably for months—or even a year. Such a possibility might include taking heat from buildings in summer and storing it for use in winter, and is most certainly conducive to the idea of advancing or delaying the heating phase sufficiently to be in time with available "off-peak" electric current. This would be of great importance to producers of electric power who are continually striving for an improved load factor.

Following the principle advanced by Walter Gropius, architectural genius and educator at Harvard, in "Learn by Doing," Charlton has amplified the usefulness of the heat pump a great deal, and yet each job that is done shows the way for improvements in work that is to follow.

Condenser Grids Buried In Floor

His first extraordinarily creditable achievement was that of using condenser grids under the basement floor of a supermarket. These condenser grids, consisting of 5,000 feet of ⅝-in. copper tubing for condensing "Freon" refrigerant, are buried in wet clay 12 in. below the floor for year-round operation of a system of food coolers of 16-ton capacity. The system has now been in use for two and one-half years and the condenser is serving its purpose very well.

The ground condenser is permanent, is the least expensive to install, and is the most economical in operation. It yielded a bonus benefit that is almost invaluable, in that it provides a bone-dry basement with a floor surface temperature around 65° F.

Such a by-product is very desirable in any basement, and particularly in the basement of a supermarket where cartons of food stuffs and other merchandise are stacked from floor to ceiling in temporary storage.

This project has a place in the history of progress with the heat pump, and contributed valuable design data by having proved that a ground condenser coil of this kind with runs of ⅝-in. copper tubing under a basement floor, spaced 15 in. apart and embedded in permanently wet clay, will safely deliver 40 B.t.u. per linear foot per hour into the earth by direct condensing of "Freon-12" in a climate like that in Hartford.

Added Benefit from Food Cooler Heat

This job, although regarded as very successful, has given rise to the idea that an additional benefit could be obtained in winter by using the heat from the food coolers to help out in heating the building, since condensation in the basement is not a problem in winter.

The success story at the supermarket soon became known to Mucke & Sons who are in the sausage business in Hartford. With the help of Charlton, the sausage firm installed a heat pump in a new addition to its plant and thus put another well-formed link in that chain of ideas which in time will raise the heat pump to maturity as a valuable piece of equipment which can economically perform a double service.

In the sausage plant the first function of the heat pump is to remove heat from the sausages and to direct it where it will do some good. In winter the heat is sent through a copper tube radiant panel heating system in the floors of the offices and service areas. In addition it is used to heat water for the lavatories and other uses about the plant.

Heat Left Over

Even on the coldest days a considerable amount of heat is left over to be stored in the ground under the building by circulating "Freon" through coils of copper tubing located under the basement floor.

Through the operation of thermostatic control valves the heat thus stored in the earth is automatically picked up by the refrigerant and delivered to the floor coils in the offices and service rooms to warm the building at night and on Saturday and Sunday when the plant is shut down. In summer some of the heat extracted from the cooler is used for making hot water and the remainder soaks into the ground under the building where it is stored and at the same time insures a dry basement.

The heat pump in the sausage plant is small, but very original in many respects, and has made a worthy contribution to the furtherance of this double-duty machine in commercial and industrial applications.

It consists of a package unit with two 3-hp. water-cooled compressors. The sausage cooler is an insulated room 25 x 35 ft. in size with four circular cooling units suspended from the ceiling. The temperature in the room is maintained at 40° F. and the maximum cooling load is figured at 60,000 B.t.u. per hour.

The floor coils for radiant heating have upwards of 500 ft. of copper tubing and there are 800 ft. of tubing in the ground below the basement floor. Inside a heat exchanger type receiver tank there are 300 ft. of tubing in the form of a helix for transferring heat from the refrigerant to city water that is used in the lavatories and elsewhere.

Use Two 80-Gal. Tanks

All of the mechanical equipment is mounted on a steel frame in very

(Concluded on next page)

FOR SALE AT DISTRIBUTOR'S COST

22 brand new self-contained beverage coolers in original crates. America's most famous nationally-advertised brand. Act now. These will move quickly.

Box 3973, Air Conditioning & Refrigeration News

SACRIFICE AT BELOW DISTRIBUTOR'S NET COST

19 brand new self-contained air conditioning units, Model FD-20 two-ton single-phase—in original crates. America's most famous nationally-advertised brand. Take one or all. Must sacrifice these units now.

Box 3974, Air Conditioning & Refrigeration News

SACRIFICE

10 brand new console ¾ HP console-type room air conditioners. Famous nationally-advertised brand. Must be sold at once. Will sacrifice these units. Best offer will be accepted.

Box 3975, Air Conditioning & Refrigeration News

BELOW DISTRIBUTOR'S COST

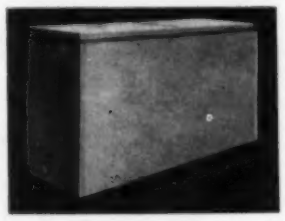
16 brand new Ice Machines Model SC-250—produce over 2,000 pounds of flaked-type ice daily. America's most famous nationally-advertised brand. Must sacrifice. Will sell at below distributor cost. 3 HP condensing systems—single, two and three-phase motors available—Act now.

Box 3976, Air Conditioning & Refrigeration News

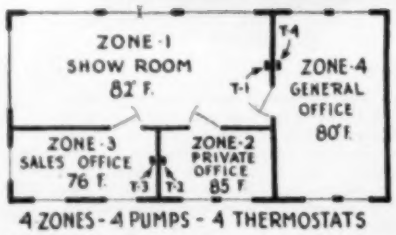
Vary Your Temperature *to Suit Room Needs*

AIR CONDITION *with* DOLE *Ice-Cels*

If your building is composed of both large and small rooms or zones, each zone requiring a different temperature or variable temperatures, DOLE Ice-Cels will provide ideal air conditioning. An office can be cooled after business hours without air conditioning the entire floor or building and rooms can be kept at different temperatures to suit the occupants.



DOC DOLECO Says—23 years of specialization in plate refrigeration have made DOLE the leader, often imitated but never equalled.



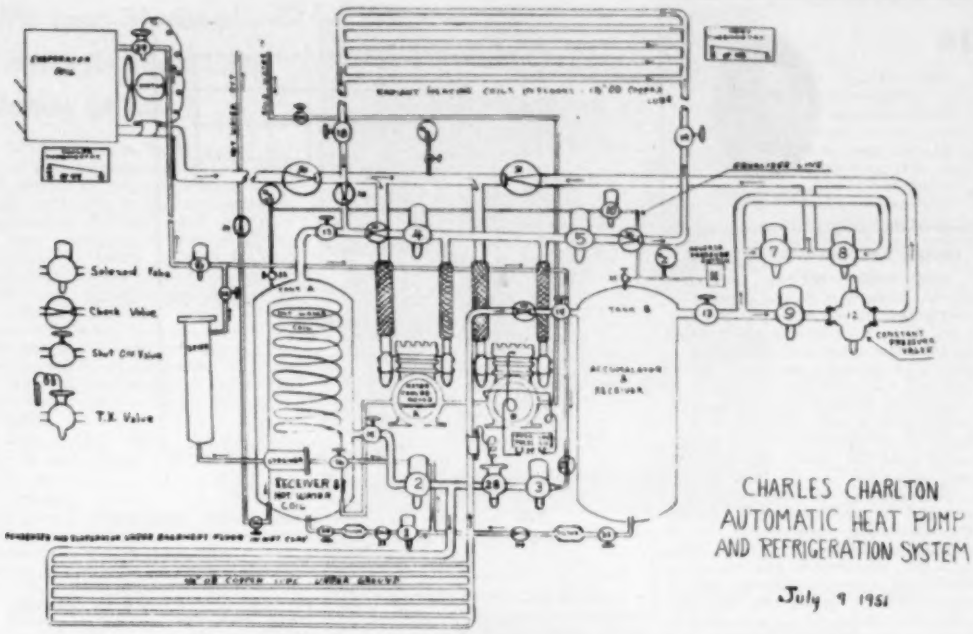
4 ZONES - 4 PUMPS - 4 THERMOSTATS

For complete data on DOLE Ice-Cels, ask for Catalog.

DOLE REFRIGERATING COMPANY
5920 N. PULASKI RD., CHICAGO 30, ILL.
103 Park Ave., New York 17
In Canada: Dole Refrigerating Products Limited, 44 Elgin Street, Brantford, Ontario.

25th Anniversary

Eliminate all water problems!
UNICON by KRAMER
REMOTE TYPE AIR COOLED CONDENSER



SCHEMATIC DRAWING of heat pump design of the sausage plant.

Double-Work Cycle Offers Wide Latitude

(Concluded from preceding page)

compact arrangement. Beside the compressors there are two 80-gal. tanks, one, a heat exchanger receiver tank, and the other a surge tank or accumulator for vapor and liquid refrigerant. The latter is to serve as a compensator at the time of reversal of flow.

What with the wonders of automatic setting and resetting of solenoid valves with shut-off valves, thermostatic expansion valves, and a constant pressure valve, plus automatic balancing or equalizer valves, the system operates to the complete satisfaction of the engineer and the owner.

Heat Saved from Food Processing

The Mucke heat pump installation is unique and original in that it takes heat from the cooler in food-preparing processes and puts some of it into the floors of offices for radiant heating; another portion of the extracted heat is used in heating city water for domestic purposes. The excess heat is stored in the ground and returned for use in heating when the sausage plant is not in operation.

This installation with its ingenious hook-up of thermostatic valves and compensating receiver and balancing devices represents considerable progress in the exploitation of the double-work cycle of the heat pump, yet as in the case of the supermarket installation, its successful operation has already prompted some additional thinking by the owners and engineer. It may be that another time they will plan to extract the heat from the smoke house and use it to help cook the sausages.

Takes Care of Night, Weekend Heat Load

The Mucke job has also furnished actual proof that heat can be stored in the ground. With condenser coils only two feet below the basement floor, sufficient heat can be stored to take care of a reasonable heating load on nights and weekends in a climate such as that in Hartford.

That this should be possible in almost any locality is borne out by tests that were made and plotted by Prof. Charles H. Coogan, Jr., University of Connecticut, where in winter, with an underground coil six feet below grade, it required six weeks to freeze six inches of ground outside the tube and took nature 100 hours to melt six inches of frozen ground.

A more homely illustration, but in reverse, is the phenomenon as at "Ice Gulch" in Randolph, N. H., where, because of shade and the delay in the penetration of the summer's heat there is perpetual ice. In the greater view of the usefulness of the heat pump this would seem to indicate the possibility of storing heat for use later on. It may even be possible to help nature in a small way by evening out the warmth that is sent to the earth's surface by the sun, storing it away while refrigerating in summer and then using it in winter for heating our buildings.

In warm climates where heating is not required, the summer's heat and that from summer cooling or comfort conditioning can possibly be used as a by-product for industrial processes where evaporation, distillation and drying are involved in a range that is suitable to the heat transfer and work characteristics of the heat pump.

Coming Back for More

Airtemp Cools New Havana Quarters of Brokerage Firm

HAVANA, Cuba—After five years' successful experience with air conditioning, the firm of Merrill, Lynch, Pierce & Beane, stock brokers, chose the same contractor to air condition its new and larger quarters.

Back in 1946, La Antillana, Chrysler Airtemp distributor in Cuba, sold this firm the first air conditioning ever installed for a stock broker in this country. Airtemp equipment was used on the initial system as it is in the new quarters.

Construction details of the new installation are rather simple. Two 8-ton Airtemp package units supply conditioned air to the establishment through ducts connected to ceiling diffusers. All parts of the offices are air conditioned, including the main "board" room, sales rooms, and private offices.

The "big board" facilities are complete and carry quotations direct from the New York stock exchange.

Furniture and the other appointments were selected with care to achieve the proper atmosphere. The private offices are luxurious but not gaudy, and the sales rooms are comfortable while still functional.

Plans Weaving Room Cooling

SHELBY, N. C.—Plans for the immediate enlargement of Ora Mills here in an extensive modernization program were announced by President J. R. Dover, Jr., who said the weaving room will be air conditioned.

Biggest Need Today Is for Understanding Value of All-Year Home Air Conditioning

NEW YORK CITY—All-year home air conditioning "bids fair to become the Cinderella industry of the 1950's," John A. Gilbreath, assistant vice president in charge of air conditioning for Servel, Inc., predicted at a meeting here.

"You would almost have to be part of the industry itself to appreciate the tremendous amount of interest in all-year home air conditioning," he said. The interest he explained has been stimulated in large part by the increasing number of people exposed daily to air conditioning in business offices and in places of recreation.

Disclosing that Servel would soon start manufacture of the first oil-fired all-year home air conditioner, Gilbreath asserted that the public would now have at its disposal a line of air conditioners to operate on any fuel. Servel at present manufactures both a gas and steam-fired air conditioner.

He voiced optimism over the possibilities of educating financial institutions, pointing out that many insurance companies and banks had now come to realize that air conditioning helped insure an investment over a long period of time.

"In Springfield, Mass., Servel equipment has been in use in two apartment developments for some time," Gilbreath said, "and in both cases a large insurance company which underwrote the mortgage helped influence the builders' decision to use this equipment.

"They felt that these apartments would be occupied long after those in buildings without this feature were vacant. Also, they felt that this type of equipment would attract tenants who would be a good financial risk.

"The public is sold on all-year air conditioning and it is now up to industry to demonstrate that it is in a position to do the job," Gilbreath declared.

Among the things industry must do he listed:

Educate architects to the need of designing homes specifically around all-year air conditioning.

Educate heating and plumbing engineers to the needs for simplifying installations.

Educate both government and private lending agencies on the true benefits of all-year air conditioning for a proper mortgage valuation on the equipment.

Continue research and development to further reduce both equipment and installation costs.

Tracing the development of air conditioning since the early part of the century, Gilbreath said that in 1951 it had reached the status of a billion dollar industry. He said much of the growth had come since 1940 with sales in 1951 600% over those of 11 years earlier and 300% over those of 1946. He foresaw an increase of 25% possible for all-year home air conditioning this year.

The only thing that might interfere with this increase, Gilbreath said, was the continuance of the stringent effects of Regulation X which now serve to channel home building into the cheaper house field.

Pointing out that one major industry had come up about every 10 years to provide new contributions to better living, he listed automatic refrigeration in the 1920s, radio in the 30s, and television in the 40s.

He predicted that the greatest period of development and sales volume would come in the next several years, adding that the industry could double or even treble its billion dollar volume of 1951 if unsettled world and national conditions did not interfere.

He said the education job required of industry had been started and it was largely a matter of following through to take advantage of present day interest.

"A number of architects are sold on the idea of all-year home air conditioning but be need even more.

"An increasing number of firms are now in the field, compared to Servel which was alone in 1939 when it introduced the first unit at the World's Fair here in New York. The industrial know-how and the promotional activities of these firms will be a big stimulant. However, the biggest need today, as I see it, is for a further understanding of the value of all-year air conditioning.

"Both the manufacturer and the builder and his engineering staff can be a great help in this regard."

LOOK to LARKIN

for Quality

HIGH AND LOW BOY MODELS

LARKIN WALL HUMI-TEMP

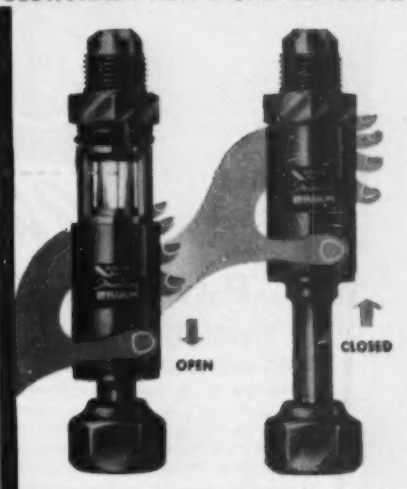
Quality speaks a language everybody understands. Wholesalers, dealers, and users alike know that the name *Larkin* means quality—of workmanship, materials, and performance.

Manufacturers of the original Cross-Fin Coil — Humi-Temp Units — Evaporative and Air Cooled Condensers — Air Conditioning Units and Coils — Direct Expansion Water Coolers — Steel Vacuum Plate Coils — Heat Exchangers.

WATCHDOG OF THE NATION'S FOOD SUPPLY

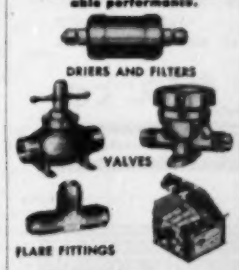
LARKIN COILS

ANNOUNCING! A REVOLUTIONARY NEW LIQUID INDICATOR



sliding sleeve keeps new Mueller Brass Co. QUIK-SIGHT liquid indicator clear and clean at all times

Have these STREAMLINE products on hand for every job where you want dependable performance.



STREAMLINE refrigeration products are individual and multiple packaged for complete protection. Write for catalog R-151 describing complete line of STREAMLINE refrigeration products.

● Just slide back the copper protective sleeve on the new Quik-Sight Indicator and your refrigerant supply is instantly and clearly visible. Return the sleeve to closed position and the window is securely guarded against breakage. Two "O" rings in the assembly form a positive seal against dust, dirt and oil film when the sleeve is closed.

The revolutionary glass-to-metal soldering of Quik-Sight Indicators provides a thoroughly tight seal for any refrigerant, and eliminates need for gaskets and threaded joints that often work loose with vibration. Indicator design allows for thermal expansion through the whole assembly without strain.

Quik-Sight Liquid Indicators are easy to install. Wide wrench flats make it easy to get connections tight. The swivel connection on the flare end simplifies attachment to valves, driers or line because it eliminates all twisting strain on the indicator assembly during installation.

Quik-Sight Indicators are available in ¼" M. Fl. x ¼" Fem. Fl. and ⅜" M. Fl. x ⅜" Fem. Fl. There are MUELLER BRASS CO. Liquid Indicators to fit most installations. For complete information consult your refrigeration wholesaler or write to—

69-A

STREAMLINE PRODUCTS

MUELLER BRASS CO. PORT HURON 10, MICHIGAN

There's always one that's better... and in controls it's Ranco!

Ranco controls give dependable satisfaction to customers and servicemen alike. That's why there are over 35,000,000 Ranco controls in use throughout the world . . . more in use than any other make! Insist on Ranco controls, available for more than 4,000 replacement installations.

Ranco Inc.
COLUMBUS 1, OHIO
WORLD'S LARGEST MANUFACTURERS OF REFRIGERATION CONTROLS

Refrigeration Problems

and their solution

by Paul Reed

For Service and Installation Engineers

Paul Reed

Automatic Defrosting (3)

Although electric heat defrosting is the most popular method for household refrigerators and is also used exclusively by one large manufacturer of commercial fixtures, hot-gas defrosting is the most popular method for commercial fixtures.

There are many variations of hot-gas defrosting of commercial fixtures and the larger types of freezer rooms, but it is essentially the same as in household refrigerators, that is, the hot discharge gas from the compressor is used to heat and defrost the evaporator.

The hot discharge gas, instead of going to the condenser, is led from the compressor through a "hot-gas line" directly to the evaporator, thus by-passing the condenser, receiver, liquid line, and expansion valve. In this way, the heat in the compressor discharge is put directly into the evaporator.

Moreover, the heat thus given to the evaporator is introduced into the evaporator from the *inside* and not from the outside. By applying the heat from the inside, the ice on the evaporator is first melted next to the evaporator, and, being loosened from the evaporator, the ice may fall off in chunks or sheets if the ice has formed to an unusual or excessive thickness, rather than to be entirely melted as must be done if the heat is applied from the outside as with electric or water defrosting.

On the other hand, hot-gas defrosting has some serious disadvantages and presents some difficulties in applying it. These problems can be solved, but first they must be understood if they are to be overcome.

COMPRESSOR MOTOR OVERLOAD

When the hot gas goes into the cold evaporator it condenses into a liquid, just as in normal operation the hot gas does when it goes into the condenser. At first, the evaporator is very cold, and the condensation occurs at a low temperature and consequently at a low pressure.

As the evaporator warms up, the suction pressure rises, and before defrosting is completed at a temperature of above 32° F., the suction pressure will have risen to well above 30 p.s.i.g., or whatever condensation pressure is, corresponding to the temperature to which the evaporator has been warmed.

Hot-gas defrosting is used mostly on evaporators operated at temperatures of 0° and below, and the condensing units used are "low temperature" type units with their motors sized for evaporator temperatures of 5° and below, and corresponding suction preasures of 12 p.s.i.g. and less ("Freon-12").

During hot-gas defrosting, evaporator temperatures must necessarily rise far above 5°, and suction pressures of 12 p.s.i.g., thereby overloading the condensing unit motor during the defrosting period.

To prevent this, automatic valves may be used in the suction line to throttle the pressure to the compressor so that even though the evaporator pressure is excessive, the suction pressure to the compressor, and which determines the load on the motor, is kept low enough to prevent overloading the motor.

CONTINUING SUPPLY OF HEAT

Just before hot-gas defrosting starts, there is a normal amount of refrigerant in all parts of the system. When the valve in the hot-gas by-pass line opens, and defrost starts, hot, high pressure discharge gas is fed into the evaporator. This rise in evaporator pressure closes the thermostatic expansion valve, so that it feeds no refrigerant into the evaporator from the liquid line, receiver, and condenser.

Consequently, the only refrigerant received by the evaporator during the defrosting must come to it through the hot-gas line in the form of a hot, superheated gas, which as mentioned above, condenses into a liquid when it comes into the cold evaporator. Some of the gas remains a gas at the evaporator pressure, and since the compressor is running, is drawn back to the compressor. This, however, is a comparatively small amount.

As defrosting continues, more and more of the hot gas condenses into a liquid in the evaporator, and less and less remains a gas to be drawn back to the compressor and be recompressed and recirculated. As a result, the compressor gradually "runs out" of refrigerant to pump. The evaporator gradually gathers more and more of the refrigerant as condensed liquid lying in the evaporator, and gradually the suction pressure becomes less.

This means that at first, hot-gas defrosting is very effective, but as it progresses, it gradually "runs-down"; the refrigerant builds up in the evaporator as a liquid, the suction pressure becomes lower and lower; until finally the system practically "runs out" of heat for defrosting.

Unless some additional heat is furnished from some other source, the first few minutes of hot-gas defrosting are the only ones during which defrosting is effective. After five minutes or less, there is so little heat available, that unless some additional heat is furnished, defrosting becomes less and less effective.

This means that although hot-gas defrosting is rapid for the first few minutes, the rate of defrosting soon slows down to the point where little or no further defrosting is being accomplished. If almost all of the defrosting cannot be accomplished during those first few minutes, it will be done more and more slowly. That is, if almost all of the ice is not removed during those first few minutes, it becomes increasingly difficult to remove it.

PITFALLS OF HOT-GAS DEFROSTING

As mentioned previously, refrigerant condenses in the evaporator when the hot gas strikes the cold evaporator. During the defrosting period, the liquid refrigerant condensed from the hot gas continues to accumulate in the evaporator.

By the time defrosting has been completed, there is far more liquid in the evaporator than during the normal refrigeration operation. Moreover, when the valve in the hot-gas line closes, the evaporator pressure drops rather rapidly.

As a result, the liquid refrigerant in the evaporator tends to "slug" back to the compressor.

Accumulation of liquid refrigerant in the evaporator during hot-gas defrosting, and the "slugging" due to this liquid rushing back to the compressor at the beginning of the refrigeration period following defrosting, is inherent in the hot-gas defrost method, just as the tendency to "run out" of heat is also inherent in hot-gas defrosting. Also inherent is the build-up of evaporator pressure during the hot-gas defrosting period.

Supplementary heat can be added to overcome the tendency to "run out" of heat during hot-gas defrosting, and a suction pressure throttling valve can be used to hold down the suction pressure to the compressor.

For the hot-gas method of defrosting to be successful, means must be provided to vaporize the liquid in the evaporator before it gets back to the compressor. ***This can hardly be over-emphasized.***

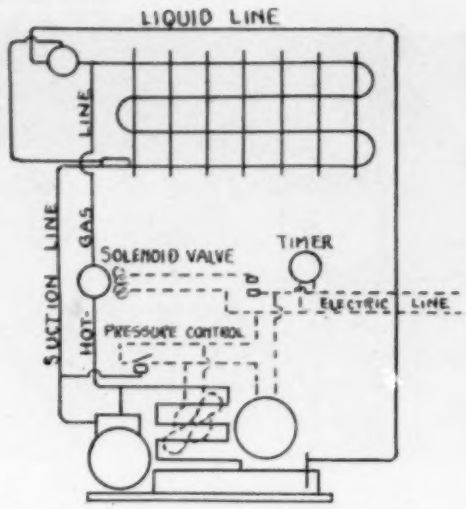


FIG. 1—Simple automatic hot-gas defrost with solenoid valve in hot-gas by-pass line actuated by defrost timer.

Hot-gas defrosting can be a very effective method, but if any one of these conditions inherent in the hot-gas defrost method is ignored or not adequately provided for, defrosting may not be effective and/or operation may be noisy, and the compressor may be damaged in a very short time.

Automatic defrosting commercial low temperature equipment is not simply a matter of running a hot-gas by-pass line from the compressor discharge to the evaporator, and connecting up a timer to start and stop defrosting occasionally.

SUPPLEMENTARY HEAT

To overcome this natural weakness of the hot-gas defrosting method to run out of heat, additional heat from some source should be supplied so as to carry on the defrosting to completion. This additional heat may be supplied from various sources, and it will be well for us to consider some of these possible sources of additional heat that are used to supplement the gradually dwindling heat supply that is inherent in, and to be expected in ordinary hot-gas defrosting.

The additional heat may be applied in any one of several places. One place is to the hot-gas line. An electrical resistance element is wound around or clamped to the hot-gas line. The current is turned on to the resistance at the same time that the valve in the hot-gas by-pass line is opened. The heat from the resistance heating element keeps the discharge gas from the compressor hot throughout the full defrosting period.

To do this automatically, the valve in the hot-gas line is an electric solenoid valve. At a predetermined time, one or more times a day, according to how the defrost timer is set, the timer turns the current on to the hot-gas solenoid valve thus opening it, and at the same time, on to the resistance in contacts with the hot-gas line.

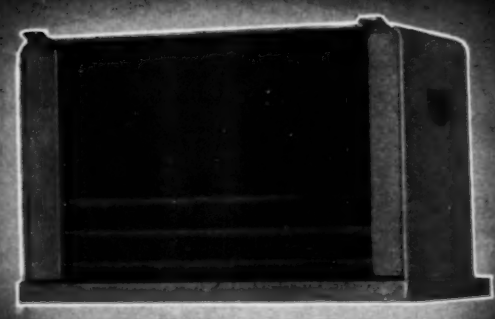
Heat is thereby added to the hot-gas line and this added heat keeps the hot gas hot, and assures a continuing high rate of defrosting. The timer is set to turn off the current to the electric heating element and to the solenoid valve after a certain number of minutes previously determined on the basis of experience. This closes the solenoid valve and turns off the electric heater, and defrosting stops.

(To Be Continued)

GRAD-U-MATIC AIR CONDITIONING
"LIFETIME" PORCELAIN OR STAINLESS STEEL EXTERIORS
Choose
"P-H" REFRIGERATORS
for Trouble-FREE Service...Year after Year!
Accepted as the leaders in their field for over 50 years, P-H Cases and Cabinets give you the most efficient preservation of food through the exclusive Grad-U-Matic Air Conditioning system . . . longer life through such important features as Electrically Welded Steel Frames, Rigid Fiber Glass Insulation, Triple Thermopane Sealed Glass Windows, Welded Interior Porcelain Lining and "Lifetime" Porcelain or Stainless Steel Exteriors . . . plus an unmatched record of trouble-free performance, year after year. Every P-H Refrigerator is factory tested for temperature and efficiency including highly sensitive electronic leak detector tests. Illustrated above is the Model P-35-4 Self Contained Reach-In. Also available in 50 other models with capacities from 30 to 90 cu. ft., remote or self contained.
SEE YOUR NEAREST P-H DEALER FOR REACH-IN CABINETS . . . DAIRY-DELICATESSEN CASES . . . BEVERAGE COOLERS . . . PASS-THRU CABINETS . . . DOUGH RETARDERS . . . FLORIST CABINETS AND WALK-IN COOLERS.
PUFFER-HUBBARD MFG. CO.
GRAND HAVEN, MICHIGAN
UL Listed Under Re-Examination Service of Underwriter's Laboratories, Inc.

Any size compressor can be air cooled!
UNICON by KRAMER
REMOTE TYPE AIR COOLED CONDENSER

BETZ
UNIT COOLERS



Compare

MODEL	BTU CAPACITY At 1° TD	At 12° TD	At 15° TD	CFM	SURFACE SQ. FT.
260UC	260	3120	3900	485	82.34
347UC	347	4164	5205	680	109.39
443UC	433	5196	6495	760	121.49
540UC	540	6480	8100	995	154.13
688UC	688	8256	10320	1260	204.19
867UC	867	10404	13005	1670	256.50
1080UC	1080	12960	16200	1975	307.92
1490UC	1490	17880	22350	2770	443.14

Sold by Leading Wholesalers
BETZ CORPORATION
HAMMOND • INDIANA

NPA Eases 'Hardship' Criteria for Small Firms Starting on July 1

WASHINGTON, D. C.—After July 1, small businesses may receive extra allotments of controlled materials if they are unable to maintain minimum production and supervisory staff.

This represents an easing of the criteria by which these firms had previously been judged eligible to draw on the National Production Authority's hardship account. In the past they had to be faced with failure or prolonged shutdown before they were entitled to assistance.

NPA said an easing of the supply of critical metals makes this move possible.

The revised criteria to be applied to hardship cases is as follows:

1. The firm must be a small firm as defined by the Department of Commerce "Size Study." Firms which are connected with larger corporations will not qualify even though they be classified as "small" as far as their own corporate entities are concerned.

2. The firm must produce or ship more than 50% of its value of production or shipment in civilian type goods.

3. The concern is unable to maintain a minimum production and supervisory staff.

4. The firm is unable to produce articles by using substitute materials. Burden of proof rests with the applicant, NPA said.

The agency noted that 374 firms have already received assistance from this account.

LEFT: Compact companion to Kelvinator's 12-cu. ft. refrigerator-freezer combination is this new 9.4-cu. ft. model, featuring a cabinet only 28½ in. wide. To be promoted as a "true" two-temperature model, it has a completely separate freezer chest surrounded by insulation, with separate control.

BELOW: Heart of Kelvinator's refrigeration system for two-temperature cabinets is the "humidiplate," currently in use on the company's 12 and 9.4-cu. ft. two-door refrigerator models.

Kelvinator Refrigerator--

(Concluded from Page 1, Column 4)

cupied by these old refrigerators without involving kitchen alterations.

"Second, the KT actually gives the replacement customer two appliances—a true freezer as well as a refrigerator—in place of one.

"Third, with its companion MT, it is a dual-purpose cabinet that permits adjustable control of moisture as well as cold in the refrigerator compartment."

The 28-in. KT incorporates the same type of twin-control refrigeration system employed on the larger MT, Lawson said, and features the "humidiplate" for auxiliary refrigeration and moisture-control in the refrigerator compartment.

Lawson said the freezer compartment of the KT is designed to operate at approximately 0° F., and will store up to 44 lbs. of frozen foods for as long a period as full-size home freezers.

Since there is no circulation of air between freezer chest and normal food storage area, as in conventional single and double-door refrigerators, separate cooling is required for the lower refrigerator compartment of the KT.

This is provided by refrigerating coils in the compartment walls, and by the "humidiplate," a refrigerated metal plate featured in both MT and KT models. The "humidiplate" is fitted on the inner rear wall of the refrigerator compartment, and at the normal dial setting, maintains a temperature of 32°.

When the refrigerator mechanism automatically cuts off during normal operation, temperature of the "humidiplate" rises immediately above the freezing level, and any icy film that has collected melts away.

Defrost water from the "humidiplate" is channeled down the rear wall of the compartment, and through a short, wide, cleanable drain into a pan suspended below the cabinet.

A coil of the refrigeration tubing passes over the pan, bearing warm refrigerant from the compressor. The heat from the coil is sufficient to evaporate the little water so the pan need not be emptied.

The KT has three shelves in the lower compartment door, for smaller, less perishable items; two large sliding crispers; adjustable shelves, and an accessory plug-in butter chest.

Suggested retail price is $449.95.

Basic Refrigeration Controls

The regular weekly instalment of the series "Basic Refrigeration Controls" prepared by the Service Information Division of White-Rodgers Electric Co. has been omitted from this issue of the NEWS to make room for additional special articles on air conditioning. The series will be resumed next week, however.

Sears Trims Prices on '52 Refrigerator Line

CHICAGO—Sears Roebuck & Co. recently introduced its 1952 line of Coldspot refrigerators with prices trimmed as much as 16% under similar 1951 models, it was reported here.

The line includes four 7-cu. ft. units ranging in price from $179.95 to $229.95, four 9-cu. ft. boxes priced from $199.95 to $319.95, and two 11-cu. ft. models priced at $269.95 and $349.95.

Features include automatic defrosting, two-tone green interior color styling, and storage in the door.

A Sears official indicated that the price cuts were intended as sales stimulants in the face of intensified competition in the appliance field.

Fedders Names Cooper, 3 Branches of Graybar

BUFFALO—Appointment of Troy Cooper as Pacific Coast district sales manager for Fedders-Quigan Corp. has been announced by Frank A. Mitchell, sales manager, Refrigeration Appliances Div.

Cooper operated his own distributor business in Joplin, Mo. from 1947 until his appointment to Fedders. Previously, he had served in several sales capacities for major oil companies in the midwest.

Mitchell also announced that three midwest branches of Graybar Electric Co. have been named distributors by Fedders-Quigan. Markets covered by this arrangement are Omaha, Wichita, and Kansas City.

ALUMINUM TUBING BY...

United WIRE

2S & 3S ALLOYS

COILS & STRAIGHT LENGTHS

SPECIALLY MADE FOR REFRIGERATION

CLEAN?

YES . . . processed to remove all grease, dirt, aluminum dust and all other foreign substances.

PRECISION QUALITY . . . WELL PACKED

On mill order to specifications

UNITED WIRE

A SUPPLY CORPORATION

PROVIDENCE, RHODE ISLAND

WHY WAIT?

Get your new product info pronto. Use coupon on "What's New" page in this issue.

FULL-COLOR NATIONAL ADVERTISING

will help sell the hottest "Cold-Line" in the nation in '52

Manitowoc

SUB-ZERO FREEZERS

Watch for this "Treasure-Island" ad in May and June issues of

Better Homes and Gardens

Country Gentleman

Gentlemen:
Please rush me all the details on your line of Sub-Zero freezers.

Name .....

Company .....

Address .....

City ..... State .....

Distributor ..... Dealer A-4

Manitowoc Equipment Works

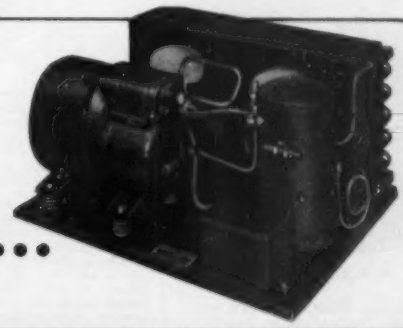
the first TO BRING HOMEMAKERS SO MUCH FREEZER CAPACITY IN SO LITTLE FLOOR SPACE!

SWEDEN Helps Fountains BEAT Rising Costs and Ceiling Prices

SWEDEN Quality FREEZERS

SWEDEN FREEZER MANUFACTURING CO. SEATTLE 99, WASHINGTON

"Why Always Servel SUPERMETIC?..."



"I'll Tell You Why..."

SUPERMETIC IS QUIET — rests securely on its flexible mountings — runs smoothly with an absolute minimum of vibration.

SERVEL FORCE-FEED LUBRICATION — Keeps every working part fully protected — prevents excessive wear and friction — assures longer problem-free performance.

SUPERMETIC IS COMPACT — easily installed in any fixture — easy to check — free of complicated, troublesome mechanisms — saves valuable space.

OIL-FREE REFRIGERANT rules out oil "slugging" damage of running parts — maintains high capacity and efficiency.

Right! And don't forget Servel's famous low-cost Five-Year Protection Plan . . . Servel's nation-wide network of 92 authorized wholesale suppliers . . . Servel's 30-year reputation for soundest refrigeration engineering and all-around reliability — all good reasons why it will pay you to always specify Servel electric condensing units. Models for every commercial refrigeration and air-conditioning use . . . ⅓ to 5 HP.

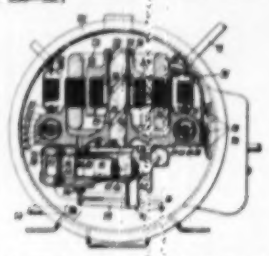
SEND NOW FOR FREE MANUALS — — write Dept. A-43 for new sales literature and installation data. Or see your Servel wholesaler now.

SERVEL, Inc., Electric Refrigeration Division, EVANSVILLE 20, INDIANA

PATENTS

Week of February 26 (Continued)

2,587,346. HERMETIC REFRIGERATION COMPRESSOR. Jens Tonberg, Tecumseh, Mich., assignor to Tresco, Inc., a corporation of Michigan. Application Nov. 25, 1949, Serial No. 129,788. 7 Claims. (Cl. 230—58.)



1. A compressor having a crankcase portion and a cylinder block formed with a cylinder bore, a piston reciprocably mounted in the cylinder bore and provided with a transversely disposed yoke at the crankcase end thereof, a crosshead slidably mounted in the bore and formed with a diametrical bore, a drive shaft having a crank pin portion rotatably mounted in the crosshead bore, a bearing for rotatably mounting the drive shaft for rotation about its own axis, said cylinder bore and piston being angularly inclined with respect to the axis of the drive shaft, said yoke being positioned with its axis at right angles to the axis of the piston, whereby upon rotation of the drive shaft the crank pin and crosshead bore have linear movement relative to each other, an oil duct extending longitudinally of the crank pin to the drive shaft bearing, an oil bath in the crank case portion, and ports formed in the crosshead adapted to be alternately opened and closed in timed relation to the linear movement of the crosshead to alternately subject oil in the oil duct to pressure and to replenish oil discharged from the duct from the oil bath.

AVAILABLE FOR LICENSING OR SALE

General Electric Co. offers the following patents for non-exclusive licensing on reasonable terms, to domestic manufacturers. Applications for license may be addressed to the Manager, Patent Dept., General Electric Co., 1 River Rd., Schenectady, N. Y.

2,089,053, Refrigerating Machine, Reg. No. 46,636; 2,042,497, Refrigerating Machine, Reg. No. 46,637; 2,056,023, Heat Exchange Apparatus, Reg. No. 46,638; 2,059,981, Retaining Collar for Food Cabinets, Reg. No. 46,640; 2,080,649, Refrigerant Compressor, Reg. No. 46,641; 2,073,516, Refrigerating System, Reg. No. 46,643; 2,186,637, Fan, Reg. No. 46,644; 2,292,569, Cooling Units, Reg. No. 46,645; 2,289,285, Dehydrator, Reg. No. 46,648; 2,280,713, Grille for Air Circulators, Reg. No. 46,649; 2,302,447, Compressor Valve, Reg. No. 46,650; 2,564,479, Removable Shelf, Reg. No. 46,654.

Receives Dividends

F. I. DAVISON

F. I. Davison, Pres. of Davison Associates, Inc., Toledo, Ohio, says:

"We have been in Commercial Refrigeration business for 30 years and for the past 18 years have been regular readers of AIR CONDITIONING & REFRIGERATION NEWS.

"Among its many excellent features which we feel are at important to us are the 'What's New' items every week, new patents, news stories of installations . . . and the Washington news. And we all get a big kick out of the 'INSIDE DOPE' column.

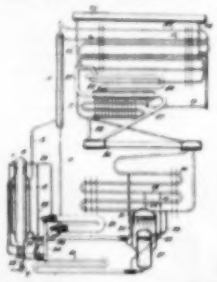
"We believe that the time we take to read the NEWS pays excellent dividends . . . and we enjoy it. We wouldn't want to miss an issue."

Davison Associates, Inc., is an outstanding distributor-dealer in air conditioning, store fixtures, and commercial refrigeration covering Northwestern Ohio and Southern Michigan with four outside salesman and fourteen servicemen.

"Look twice — it's worth the price!"
AIR CONDITIONING & REFRIGERATION NEWS
"The Newspaper of the Industry"

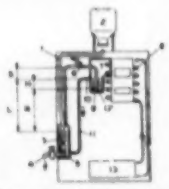
Week of March 4

2,587,620. ABSORPTION REFRIGERATION Wilhelm Georg Kogel, Stockholm, Sweden, assignor to Aktiebolaget Elektrolux, Stockholm, Sweden, a corporation of Sweden. Application Dec. 15, 1944, Serial No. 568,970. In Sweden Aug. 3, 1944. 13 Claims. (Cl. 62—119.5.)



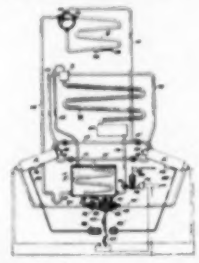
1. A refrigeration system utilizing an inert pressure equalising gas, a refrigerant fluid, and liquid absorbent, said system comprising a circuit for inert gas including a plurality of evaporator sections and a plurality of absorber sections arranged in this circuit for flow of gas therethrough in series, a plurality of separate circuits for the absorption liquid, each including one of said absorber sections and a boiler in each of which the same refrigerant fluid is expelled from solution in the absorbent liquid, a plurality of refrigerant liquefiers, each connected to receive vapor from a respective boiler and deliver liquid to one of said evaporator sections, and means for heating said boilers to respectively different temperatures to supply to said absorber sections absorption liquid having respectively different concentrations of the same refrigerant fluid.

2,587,772. WATER COOLER. Arthur Seligman, Newark, N. J. Application July 12, 1949, Serial No. 104,851. 4 Claims. (Cl. 62—125.)



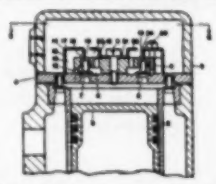
1. Method of controlling the evaporator temperature of a secondary refrigerating cycle in which a liquid refrigerant is evaporated to produce the cold, its vapors subsequently re-condensed at a higher level at low temperature and pressure, and the liquid fed back to the evaporator by gravity, whereby a constant difference between condensing and evaporating pressures is maintained by passing the vapor on its way from evaporation to condensation through a column of the liquid refrigerant which is held at a constant height.

2,587,996. ABSORPTION REFRIGERATION. Alfred G. Gross, Wilmette, Ill., assignor to The Hoover Co., North Canton, Ohio, a corporation of Ohio. Application July 5, 1943, Serial No. 493,491. 21 Claims. (Cl. 62—4.)



1. An absorption refrigerating apparatus comprising, an intermittent absorption refrigerating apparatus having two generator-absorbers each operating alternately as a generator and as an absorber and an indirect cooling system for said apparatus in open communication therewith and utilizing a portion of the refrigerant for transferring heat from said apparatus to the ultimate cooling medium.

2,588,118. MUFFLING MECHANISM FOR COMPRESSOR VALVES. Lars Hanson, Syracuse, N. Y., assignor to Carrier Corp., Syracuse, N. Y., a corporation of Delaware. Application June 10, 1946, Serial No. 675,616. 4 Claims. (Cl. 137—68.)



1. In mechanism for muffling sounds in compressor valve structures, the combination of a cover member, a valve guide member mounted adjacent said cover member, port means in said cover member, a valve adapted to control gas flow through said port means, yieldable means disposed in said guide member for urging said valve toward said port means, a chamber formed between the cover member and the guide member for the discharge of gas from said port means, a muffling member disposed about said guide member, said member including a first element adapted to form a passage for gas, and a second element adapted to form a second passage for gas, and a plurality of passages connecting the passages in said muffling member with said chamber, said first element being spaced for the discharge of gas from the muffling passages.

STATISTICS

ACRMA-REMA Survey of Compressor Shipments for December

ACRMA-REMA STATISTICAL PROGRAM
SUMMARY OF SHIPMENTS OF COMPRESSORS FOR MONTH OF DECEMBER, 1951

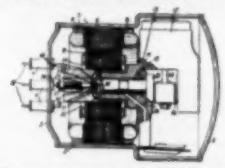
(Number Manufactured and Sold for Refrigerants Other Than Ammonia)

Horsepower	SEALED TYPE (Hermetic or Closed) FORM A: Continental U. S. Mfrs. (N)	Non-Mfrs. (O)	Total (P)	Export (Q)	Grand Total (R)	OPEN TYPE, AIR COOLED FORM B: Continental U. S. Mfrs. (N)	Non-Mfrs. (O)	Total (P)	Export (Q)	Grand Total (R)	OPEN TYPE, WATER COOLED FORM C: Continental U. S. Mfrs. (N)	Non-Mfrs. (O)	Total (P)	Export (Q)	Grand Total (R)
Sold In Unitary (End-Use) Products															
⅛ and less	XX	XX	14,261	731	14,992	XX	XX				XX	XX			
¼	XX	XX				XX	XX		*		XX	XX			
⅓	XX	XX	2,647			XX	XX				XX	XX			
½	XX	XX				XX	XX				XX	XX			
¾	XX	XX				XX	XX	†559		*	XX	XX			
1	XX	XX		367	7,343	XX	XX				XX	XX			
1½	XX	XX	3,528			XX	XX				XX	XX			
2	XX	XX				XX	XX				XX	XX	83		*
3	XX	XX				XX	XX				XX	XX		†728	*
5	XX	XX	801			XX	XX				XX	XX	157		*
Sub-Total	XX	XX	21,237	1,098	22,335	XX	XX	559	*	*	XX	XX	240	728	*
Sold as Compressor Bodies, Compressors, or Condensing Units															
⅛ and less		654					1,323		1,191						
¼												115			
⅓		356				1,542	341	4,044	719	6,902			476		519
½				2,386			526		820						
¾	99,550		101,016		103,402		312		218		137	78		43	
1						348	243	591	173	764		146			
1½		456					211		105			229			
2						200	135	646	140	941	188	170		29	
3							100		50			111	830		916
5												132		57	
Sub-Total	99,550	1,466	101,016	2,386	103,402	2,090	3,191	5,281	3,416	8,607	325	981	1,306	129	1,435
Grand Total	XX	XX	122,253	3,484	125,737	XX	XX	*	*	*	XX	XX	1,546	*	*

*Figures omitted to avoid disclosure of operations of individual companies. †Calendar year. **Notes:** Totals shown above do not include compressor bodies shipped for or incorporated in Household Refrigerators. In order to avoid disclosing the operations of individual companies, some data for two or more sizes of units are combined.

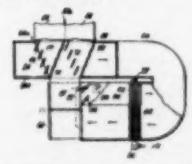
Reporting companies: Airtemp Div., Chrysler Corp.; Baker Refrigeration Corp.; Brunner Mfg. Co.; Carrier Corp.; Curtis Refrigerating Machine Div. of Curtis Mfg. Co.; Frigidaire Div., General Motors Corp.; General Electric Co.; General Machine & Mfg. Co.; Kelvinator Div., Nash-Kelvinator Corp.; Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc.; Lynch Corp.; Mills Industries, Inc.; Norge Div., Borg-Warner Corp.; Servel, Inc.; Tecumseh Products Co.; Universal Cooler Div., Tecumseh Products Co.; Westinghouse Electric Corp. (Springfield and Hyde Park [Boston], Mass.); Worthington Pump & Machinery Corp.; York Corp.

2,588,126. COMPRESSOR SHAFT ASSEMBLY. Lowell M. Kurtz, Erie, Pa., assignor to General Electric Co., a corporation of New York. Application July 2, 1948, Serial No. 36,730. 13 Claims. (Cl. 308—163.)



1. In a compressor or the like, a frame including a shaft bearing, a shaft journaled in said bearing, a first thrust bearing formed on said frame, said shaft including a shoulder adapted to engage said first thrust bearing, a second thrust bearing formed on said frame and axially spaced from said first thrust bearing, a first member arranged on said shaft and adapted to engage said second thrust bearing, said shaft having an axially extending passage therein, means or adjusting the end play of said shaft relative to said frame, said means including a second member engaging said first member and an adjustable element received in said passage for engaging said second member to vary the position of said first member, at least one of said members being curved with respect to a plane extending transversely of said shaft to facilitate self-alignment.

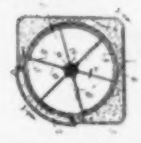
2,588,189. APPARATUS FOR PRECOOLING. Broadus Wilson, Raleigh, N. C. Application June 6, 1945, Serial No. 597,813. 2 Claims. (Cl. 98—6.)



1. In a pre-cooler for railway refrigerator cars, means forming a chamber having first and second opposed side walls, and a top and bottom, a trapezoidal plate extending between said side walls in substantially parallel relation with and intermediate said top and bottom, a first opening in said first wall and having its lower edge coincident with the longer side of said plate, a second opening in said second wall and having its lower edge coincident with the shorter side of said plate, means forming first and second ducts in adjacent, side-by-side relations, secured within said first opening and including a partition having one end edge normal to and intermediate the ends of the long edge of said plate, a supply duct secured within said second opening, first, second, third and fourth series of pivoted shutters in said chamber adapted, when closed with contiguous edges in contacting relation, to form walls respectively, (1) between corresponding first side edges of said openings, one side edge of said plate and the top of said chamber, (2) between the first side edge of said second opening, said partition, plate, and the top of said chamber, (3) between the second side edge of said second opening, said partition, plate and the top of said chamber (4) between the corresponding second side edges of said openings, the other side edge of said plate and the top of said chamber, and means connecting the shutters of each series for movement in unison between open and closed positions.

Week of March 11

2,588,563. ROTARY SHELF REFRIGERATOR. Richard M. Paul, Millard, Neb. Application Feb. 25, 1949, Serial No. 78,449. 5 Claims. (Cl. 62—89.)



1. A refrigerator cabinet comprising a housing having an external contour which has a vertical right angled corner at the intermediate portion of its rear wall and a vertical substantially quarter round front wall, whereby the housing may be fitted into a corner of a room, a vertical shaft secured within said housing, a sleeve member rotatably mounted on said shaft, a plurality of vertically spaced circular shelves secured to said sleeve member, said housing having an inner cylindrical shell extending coaxially adjacent the peripheral portions of said shelves, a pair of vertically spaced horizontal evaporator coils in the top portion of said shell, an additional circular shelf rotatably mounted on said shaft between said evaporator coils, and a vertically hinged door provided in said front wall and extending adjacent the shelves.

(To Be Continued)

Subscribe Now

Receive the greatest trade paper in the Industry—AIR CONDITIONING & REFRIGERATION NEWS. Published every week. Brings you latest news and vital information on household refrigeration, commercial refrigeration, air conditioning, home freezers; manufacturing, distributing, retailing, servicing, and contracting. Only $5 per year, 52 issues.

Fill in coupon and mail today

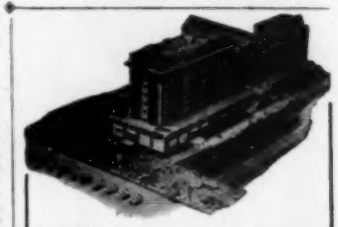
AIR CONDITIONING & REFRIGERATION NEWS
419 West Fort Street, Detroit 26, Michigan

Gentlemen: Send the NEWS for one year.

☐ $5 enclosed ☐ Bill me ☐ Bill the company

Name.....
Company.....
Street.....
City..... Zone..... State.....

4-21-52



HOTEL STRAND
A PERFECT HOTEL FOR YOUR CONVENTION GROUP

The STRAND, one of Atlantic City's Finest Boardwalk hotels is splendidly equipped to be a gracious and efficient host to every requirement of your convention group.

Ample meeting halls, display rooms, private dining rooms, all combined with complete hotel service and a selected personnel to cater to your every want.

For Special Rate Plan and Information—Address Convention Manager.

Roxanne Aids Heating Dealers

Roxanne, popular model and television star, poses with a life-size counterpart of herself which is currently being used by Minneapolis-Honeywell to add eye-appeal to the firm's electric clock thermostat dealer displays.

For Small Home Market

Steam Heating Can Compete with Forced Air By Including Domestic Hot Water System

CHICAGO—The installation cost of a steam or hot water heating system in a small residence is competitive with the cost of a forced warm air system if means for heating domestic hot water are included with each system, declared J. D. Pierce, chief engineer. Vulcan Radiator Co., in a talk before the Illinois Chapter, American Society of Heating & Ventilating Engineers.

He explained his remark by citing a specific installation—a residence located in New England and having a heat loss of 43,500 B.t.u. per hr. The structure includes a combination living and dining room, three bedrooms and bath on the first floor and a full basement. Heat loss calculations were made by a number of contractors using several standard calculation procedures and the estimated loss figures checked very closely. In addition, contractors submitted bids for the complete installation of a heating system as follows:

1. Baseboard radiation (series loop) system designed for 215° F. water temperature, $1,251.
2. Baseboard radiation system (split into two series loops) designed for 180° F. water temperature, $1,375.
3. One-pipe steam system with cast iron slim tube radiation, $1,206.
4. One-pipe hot water system using cast iron slim tube radiation and designed for 180° F. water temperature, $1,356.
5. Two-pipe reversed return hot water system using copper convectors and designed for 180° F. water temperature, $1,448.
6. Forced warm air oil-fired heating system, $1,220.

The first five systems included tankless hot water heaters whereas the warm air system did not include any provision for domestic hot water.

Citing a number of examples, Pierce said that in his opinion safety factors in designing residential hot water heating systems are unnecessary, as the actual water temperature hardly ever reaches the design temperature. He recommended that the design procedures of the ASHVE, the Heating, Piping and Air Conditioning Contractors National Association, or the Institute of Boiler and Radiator Manufacturers be followed.

In reply to a number of questions, the speaker stated that the series system of baseboard radiation does not present a balancing problem. He pointed out that in the 43,500 B.t.u. heat loss house a temperature drop of only 12° was found in the series loop baseboard system when the outside temperature was about 20° F.

He also indicated that while wall streaking with baseboard units was, of course, influenced by the design of the baseboard cover, no serious problems would be encountered if temperature were 200° F. or less.

Gas Industry Wants New Customer Curbs Retained

WASHINGTON, D. C.—The government order restricting the number of new customers that the gas industry can supply, that was put into effect last August, should be retained because the national situation is unpredictable, a special committee of the Gas Industry Advisory Council recommended to the Petroleum Administration for Defense.

The council is composed of representatives of the heating and fuel gas industry. The order affects all of Connecticut, Delaware, District of Columbia and parts of Kentucky, Massachusetts, Michigan, New Jersey, New York, and Rhode Island.

No Compressor too large to be Air Cooled!
UNICON by KRAMER
REMOTE TYPE AIR COOLED CONDENSER

Government Contracts

DEPARTMENT OF DEFENSE

Description	Quantity	Invitation No.	Opening Date
Chicago Quartermaster Depot, Quartermaster Purchasing Division, Chicago, Illinois			
Refrigerator frozen food prefabricated spec Mil-R-10141A9 QMC	200 ea	52-1307B	7 May 52
Refrigerators electric spec Mil-R-1060IA/QMC/	1200 ea	52-1310B	9 May 52
Post Engineer, Camp McCoy, Wisconsin			
Construction of a central meat cutting plant. Excavation; sewer, carpentry, painting, cold storage, roofing, electrical, refrigeration, plumbing, heating.	Job	RUI 47-C18 52-118	6 May 52
Purchasing and Contracting Officer, White Sands Proving Ground, Las Cruces, New Mexico			
Test chamber, atmospheric pressure	1 ea	R and D 1296 Q	25 Apr 52
Purchasing and Contracting Office, Schenectady General Depot, Schenectady, New York			
Refrigerator blood bank	1 ea	QM-30-127 53-141B	21 Apr 52
District Public Works Office, Sixth Naval District Naval Base, South Carolina			
Dehumidified warehouse construction & roads railroads and utilities Naval Construction Battalion center Gulfport Miss.	Job	52250	1 May 52
Commanding Officer, Naval Supply Depot, Mechanicsburg, Pennsylvania			
Thermometers dial industrial various ranges and sizes to be mfgd in accordance with various govt specs.	4434 ea	72-23180B	8 May 52

GENERAL SERVICES ADMINISTRATION

Description	Quantity	Invitation No.	Opening Date
General Services Administration, Business Service Center, 1031 South Broadway, Los Angeles, California			
Copper tubing, various sizes	236 coil	LA-453-52	4-30-52
Business Service Center, General Services Administration, Region 3, Washington, D. C.			
Exhaust fans	2 ea	431-16106R	5-7-52
Air conditioning 505 East Franklin St. Richmond, Va.	Job	GS-R3-D 1418	4-29-52
Business Service Center, General Services Administration, 518 U. S. Courthouse, Chicago 4, Illinois			
Electric water coolers	43 ea	CHD2041	4-25-52

CONTRACTS AWARDED THROUGH APRIL 11

U. S. Naval Supply Depot, Newport, R. I.
Services to cold weather test unit.—$25,000.—International Radiant Corp., 40 Matthewcock Ave., Port Washington, L. I., N. Y.

Aviation Supply Office, 700 Robbins Ave., Philadelphia 11, Pa.
Cooler assy.—128 ea., $99,050.—Airesearch Mfg. Co., Garrett Corp., 9851-9951 Sepulveda Blvd., Los Angeles, Calif.

Ships Parts Control Center, Naval Supply Depot, Mechanicsburg, Pennsylvania
Repair parts for temperature controls.—4822. $94,272.—Robertshaw-Fulton Controls Co., Fulton Sylphon Div., Knoxville, Tenn.
Valves for regulators.—132. $39,017.—Grove Controls, Inc., 4620 Hollis Street., Emeryville, California.

Stewart-Warner Cuts Prices and Improves 'Safety-Sealed' Models

INDIANAPOLIS — Drastic price reductions and claimed improved construction—consisting of a switch from cast aluminum combustion chambers to ceramic-coated, heavy-gauge steel—for two models of Stewart-Warner "Safety-Sealed" gas wall heaters, have been announced by W. E. Judd, sales manager of the heating equipment division of Stewart-Warner Corp. here.

The firm's model 991-14 "Saf-Aire" heater, which has been priced at $134.95, has been reduced to $109.95, Judd said. Model 992-20, formerly $157.95, is now $134.95.

"Production of 'Saf-Aire' heaters has been virtually at a standstill since mid-1950 because of materials shortages, particularly aluminum," Judd said. "We have been anxious to switch to ceramic-coated steel for more than a year because of several inherent advantages in both production and operation. An allotment of steel granted late in March will now permit stepped-up production of these heaters."

The Saf-Aire heater is a gas-fired gravity convector employing Stewart-Warner's "Safety-Sealed" heating principle, by which natural, manufactured, mixed, or liquefied petroleum gas is burned in a sealed combustion chamber.

The Saf-Aire model 991-14 is said to produce heat for warming rooms of modern standard construction up to 11 by 16 ft. comfortably in coldest weather. Model 992-20 is designed for larger rooms up to 14 by 18 ft.

Air Conditioning Pioneer Celebrates 50th Year

DALLAS—C. Wallace Plumbing Co., one of Dallas' pioneers in the air conditioning field, marks its 50th anniversary this spring. The story of how a small plumbing shop grew into a multi-million-dollar concern is told in a limited-edition 50th Anniversary Book which the company is distributing.

When Dallas' first air conditioning was installed in a theater, Carl Wallace, founder of the company, immediately grasped the significance of this phenomenon. He learned the whys, hows, and wherefores of air conditioning by reading and by a personal "tour" over every inch of the pipes and system. Within a few years air conditioning was a major part of his business.

The anniversary book pictures a mythical city of 54 buildings in which this firm has made installations. A listing of more than 200 other major projects is included.

Carl Wallace has now retired but his two sons, Frank E. and Sam P. Wallace and grandson Carl Preston Wallace II take an active part in company operation.

Finance Company Gets Cooling

SPARTANBURG, S. C. — Auto Finance Co. has formally opened in its new building at 258 N. Church St. Air conditioning equipment was installed by V. D. Ramseur & Sons.

CLASSIFIED ADVERTISING

RATES for "Positions Wanted" $5.00 per insertion. Limit 50 words. 10¢ per word over 50.

RATES for all other classifications $7.50 per insertion. Limit 50 words. 15¢ per word over 50.

ADVERTISEMENTS set in usual classified style. Box addresses count as five words, other addresses by actual word count. Please send payment with order.

POSITIONS WANTED

FACTORY REPRESENTATIVE: A sales executive will lose a position in a re-organization of employer's sales which eliminates salaried and full-time field representation. Now looking for a selling job in which college education and twenty-eight years experience as salesman, sales branch manager and district sales manager are required qualifications. Only three previous employers will indicate ability, stability and character. An excellent record will be submitted for investigation. Selling experience in commercial refrigeration, air conditioning, major electric appliances and shop equipment. Single and will travel or move anywhere. Interested only in a full time job with a substantial salary or its equivalent on a salary and commission basis. Write: FACTORY REPRESENTATIVE. Cosy Apartments #15. 727 Third Avenue South. Minneapolis, Minnesota.

AIR CONDITIONING, heating and refrigeration service engineer experienced in lay-out, selling and installation. Formerly operated own business. Just completed installation of five Chrysler 50 ton units for theater chain. References. Will move anywhere. Florida preferred. Ed Felver, Cole Theaters, P.O. Box 121, Rosenberg, Texas.

MANUFACTURERS: OUR organization is qualified to represent you in following states: Ohio, W. Va.; Ky.; Indiana, Tenn. Also Miss.; Texas, Louisiana, Missouri, Oklahoma. Your sales promotion problems are our specialty. All inquiries confidential if so desired. BOX 3969, Air Conditioning & Refrigeration News.

YOUNG EXECUTIVE currently with prominent domestic refrigerator manufacturing company wishes to better his position and is considering offers. Party has background of 27 years in refrigeration, 17 years with present employer. Experience covers field service, plant repair service, development and engineering production and inspection quality control. Write BOX 3971, Air Conditioning & Refrigeration News.

28 YEARS old, married, graduate advanced apprentice in refrigeration mechanics, schooled in domestic, commercial, reverse cycle, sealed units, and air conditioning. Available about June 1, 1952. Prefer Colorado, Arizona, New Mexico, Texas or Utah. BOX 3972, Air Conditioning & Refrigeration News.

DEFENSE CONTRACT specialist. Experienced in bidding, negotiation, and contracts for mechanical products and light metal fabrication. Familiar with specifications, procurement regulations, and government buying channels. Know how to avoid most of the booby traps in fine print which often give inexperienced contractors serious financial trouble. Three years as Purchasing & Contracting Officer in a large Army Ordnance Depot in World War II. Twenty five years selling experience, factory representative, district sales manager and sales engineer in refrigeration (small tonnage), air conditioning (package units) and power driven store and kitchen equipment. Will travel or move anywhere. Now employed in defense contracting department in an underpaid position. Available about May 1st. BOX 3977, Air Conditioning & Refrigeration News.

MUST CHANGE climate for the health of son. Qualified sales and service representative wants contact with manufacturer, distributor or dealer to locate in southern half of U.S. 18 yrs. in the industry. Will stand on own merits. Compensation secondary. Will travel. Details on request. BOX 3978, Air Conditioning & Refrigeration News.

POSITIONS AVAILABLE

SALES ENGINEERS—Experienced in air conditioning and refrigeration—for Westinghouse Electric Corporation, Air Conditioning Division, sales offices in midwest. Reply stating full qualifications, experience and salary to BOX 3936, Air Conditioning & Refrigeration News.

EQUIPMENT FOR SALE

NEW—⅓ and ½-hp. open type refrigerating units, air cooled. Price: ⅓ hp.-$84.34; ½ hp.-$102.60. These units are equipped with Chieftain compressor bodies and Century capacitor type motors with built-in thermal protection. Freight allowed on quantity orders of 10 units or more, may be assorted sizes. Write for literature and specifications. ARCTIC-AIRE, 1631 Grand Ave., Kansas City, Mo.

REFRIGERATOR DOORS, 2'6" by 6'8" double batten auto close doors complete with removable track heads for a 7'2" track. 1½" corkboard insulation. 16 gauge metal clad. Brand new. $95.00 each. Freight prepaid in U. S. Door height will be altered for anything up to 11 ft. 2 in. track for $15.00 additional. BIMEL CO., Cincinnati, Ohio.

FOR SALE—80 ton cooling equipment as follows: with magnetic starters and automatic controls; 2 Frick 4 cylinder Freon Compressors 4¼ x 4¼ Model F.W.-440; 2 40 H.P.—208 volt—3 phase—60 cycle 1750 R.P.M. motors; 5 Aero fin coils, 4 pipes deep, 18 pipes high 31" x 26"; 1 80 ton Buffalo fan 32" x 42" delivery 20,000 C.F.M.; 3 new American coils model 20300. BOVAL REALTY CO., 312 38th Street, Union City, New Jersey.

SACRIFICING 12 cu. ft. display freezers with superstructure and Thermopane glass sliding doors. Only $371 each, f.o.b. New York. List price $714. For complete details, write or call MANN REFRIGERATION SUPPLY CO., 440 Lafayette St., New York, Gramercy 3-8000.

$52 BUYS standard brand ¼-HP open type or sealed type complete units. Other sizes up to 3 HP. Write for complete listings on units and parts, including Klixon overload relays @ 18¢. MANN REFRIGERATION SUPPLY CO., 440 Lafayette Street, New York 3, N. Y.

YORK COMPRESSOR—model 344E20 complete with 20 HP 208 v 3 ph 60 cy motor and starter. Good condition. $375.00. SOUTHERN AIR CONDITIONERS, Lynchburg, Va.

ALL COPPER coils—Excellent condition. 1—6 row 34"x78"—30T Exp. valve $270.00. 1—6 row 24"x48"—10T Exp. valve $165.00. SOUTHERN AIR CONDITIONERS, Lynchburg, Va.

PROMINENT BRAND water valves (new) 8—½" F 12 $6.00 ea. 6—⅝" F 22 $8.00 ea. 8—¾" F 22 $8.00 ea. SOUTHERN AIR CONDITIONERS, Lynchburg, Va.

FOR SALE—brand new ⅓ H.P. hermetic compressors. Model S-88 -8¾" high. Complete with relay and overload $44.50. Send for your list on driers, valves, belts, pressure controls, fittings, relays. Supplies and parts at great savings. Sold on money back guarantee. WALTER W. STARR, 2833 Lincoln Ave., Chicago 13, Illinois.

FRANCHISES AVAILABLE

DEALER FRANCHISE available for complete line of Frigidaire appliances in one of the fastest growing cities in southwest. City has population of 150,000, immediate trading area 250,000. At present only two Frigidaire dealers. Want to add one more who will specialize in outside selling and servicing of appliances. Will require $15,000.00 to $20,000.00. Investigate this unusual opportunity and advise as to your business experience and capital. BOX 3961, Air Conditioning & Refrigeration News.

MISCELLANEOUS

HERMETICALLY SEALED units remanufactured. One year warranty. Norge all models. Hotpoint, G. E. (bottom units), $49.50. Coldspot, Frigidaire, Westinghouse, Crosley, Kelvinator, to and including ⅓ H.P., $45.00. Other models priced on request. You ship freight prepaid. Return shipment forwarded C.O.D. NORD HERMETIC CO., 1701 San Leandro Blvd., San Leandro, California.

OLD ESTABLISHED manufacturer of commercial refrigerators interested in building a line of equipment for you under your brand name. For particulars write BOX 3970, Air Conditioning & Refrigeration News.

Producers Can Shift Controlled Materials To Almost Any Product

WASHINGTON, D. C.—Manufacturers of household appliances are now authorized to shift their allotments of controlled materials to produce as much or as little of any type of appliance they desire.

This came as a result of the National Production Authority liberalizing its regulation M-47B so that all consumer durable products covered by the regulation are lumped into two groups, divided according to essentiality.

On this basis all household electric appliances, and soda fountain and beer dispensing equipment are classified in Group 1. Manufacturers of the items in this group are authorized to transfer their allotments of controlled materials from one to another of these items as they see fit. But they cannot shift allotments to items not listed in the group.

G. Harrison Echols, administrator of the order, stated, "NPA is sanctioning the greater flexibility under this amendment to counteract the effect of second-quarter allotment levels, lowest expected to be distributed by the consumer durable goods division under the Controlled Materials Plan.

"As a result, a multi-line manufacturer will be able to gear his production to changing sales trends within a quarter. He can do this by shifting allotted materials from a product in falling demand to one in rising demand, if both are listed in the enlarged Group 1 and previously have been made by the manufacturer."

The amended order took effect on April 15.

Worthington Line--

(Concluded from Page 1, Column 3)

assistant vice president and manager of the company's Air Conditioning and Refrigeration Div. Other of the headquarters staff who participated in the conferences were: W. F. Bishop, manager of distributor sales; P. H. Shaw, supervisor of distributor sales; E. R. Michel, assistant manager centrifugal refrigeration; and F. J. Watt, assistant manager, general refrigeration.

Shaw reviewed Worthington's distributor policy and presented the 1952 advertising program. He urged the Worthington field and distributor organizations to capitalize on Worthington's national advertising by using the sales tools made available to them by advertising.

Westinghouse--

(Concluded from Page 1, Column 3)

pliance division offered the following reasons why the appliance division expects to reach this goal, which based on present dollar value would put the annual volume in excess of $400 million.

Population growth that annually is adding to the nation's population two cities equivalent to Washington and Baltimore; confidence in public acceptance of new appliances such as dishwashers, electric clothes driers, food disposers, automatic washers, and dehumidifiers; the continuing trend toward the desire for more leisure time.

Sales of the entire Westinghouse Electric Corp. for the first three months of 1952 reached $323,820,000, second highest in the company's history, and an increase of 11.5% over first-quarter sales of $290,407,000 in 1951.

100-Ton Package--

(Concluded from Page 1, Column 2)

and additions, or the moving into another building.

The unit consists of three main parts—condensing section, air handling section, and air discharge section—styled as a single assembly.

The condensing section contains two radial compressors (seven and five cylinders) directly connected to a 100-hp. motor, water-cooled condenser which condenses the "F-22" refrigerant discharged under pressure from the compressors, "Freon" piping and electrical controls.

The electrical components and all controls including the compressor starter, compressor motor overload protection, fan switch, high and low pressure cutouts, and thermostats are mounted together on the side of the unit for easy accessibility.

The air handling section contains four fans which circulate 35,000 c.f.m., 28 filters (each 20 in. by 20 in.) which are washable and of the high velocity type, and four 4-row evaporator coils which have a face area totaling 73.6 sq. ft.

The evaporator coils have aluminum fins into which copper tubes are hydraulically expanded. These fins are arranged seven to the inch on ⅝-in. copper tubes. The liquid refrigerant expanding inside the tubes is fed to the coil through four 28-feed expansion valves.

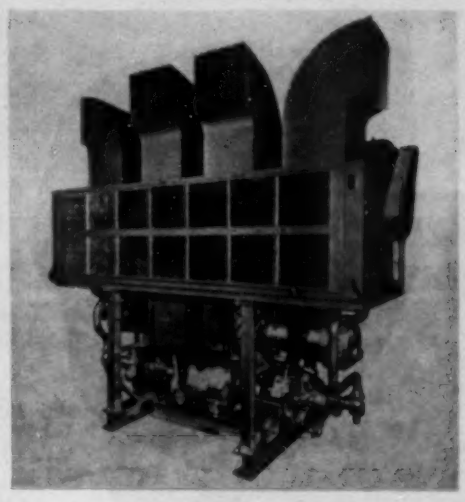
The 100-ton "packaged" unit also is available with one or two row heating coils with a capacity up to 1,450,000 B.t.u. per hr.

The air discharge section is made up of four cowls which are removable and which can be turned to direct the air in four different directions. Each cowl is fitted with louvers for horizontal and vertical deflection.

Features of the compressors in the new 100-ton unit are: (1) Radial arrangement of the cylinders. (2) An automatic capacity reduction device which keeps the unit constantly balanced to varying load requirements.

(3) An automatic starting unloader that permits the use of across-the-line starters in most areas.

Dynamically balanced, the unit causes no noticeable vibration, it is claimed. As a result it does not need a foundation, and it can be placed on the floor or roof of a building.



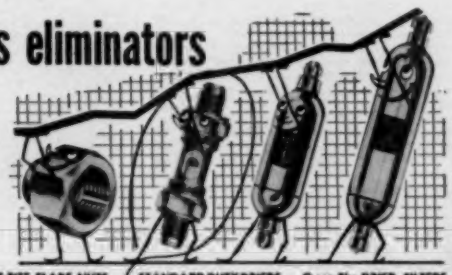
AIRTEMP CONSTRUCTION Corp., Chrysler subsidiary, has introduced its 100-ton self-contained packaged air conditioner. Unit is factory assembled and shipped complete. It is adaptable for free-blow or ductwork applications.

Giordano Sees Fedders Earnings Near '51 Mark

MASPETH, L. I., N. Y.—Salvatore Giordano, president of Fedders Quigan Corp., a leading manufacturer of heat transfer equipment, has been elected chairman of the board of directors. He will continue to serve as president, an office he has held since 1942.

At the annual stockholders' meeting held in the company headquarters here, Giordano reported that earnings for the first six months of this year will equal or surpass those for the corresponding period of 1951. Earnings for the first six months of last year were $1,071,897.

REMCO loss eliminators pull up profits for you!



FROST-TITE FLARE NUTS with forged frost-relief slots. No more losses from loosened "creeping" nuts.

STANDARD DUTY DRIERS The lowest cost, most-efficient molded drier on the market.

Cross-Flo DRIER FILTERS Heavy-duty—with new Fiberglas Depth Filter and new Remcal Drying Element.

E-Z-SEE leakproof LIQUID FLO-INDICATORS

with NEW Flow-Responsive FLAP to instantly indicate all variations or interruptions of flow.

The most versatile, dependable liquid indicator on the market—now more efficient with its exclusive new FLO-Indicator, which indicates flow by means of a sensitive FLAP in the tubular glass directly in the path of the liquid. Now the serviceman can accurately analyze the functions of the expansion valve by the action or position of the flow-responsive flap.

All E-Z-See Liquid Indicators are E-Z to see thru; positively leakproof; perfectly safe for pressures to 500 psi. In sizes ¼" to ½"—plus new larger sizes in ⅝" to 1⅛".

TYPE 277 TYPE 278

Send for Literature and Prices

CARRIED IN STOCK BY LEADING WHOLESALERS EVERYWHERE

REMCO INCORPORATED ZELIENOPLE, PENNSYLVANIA

NO WATER FOR CONDENSING!

UNICON by KRAMER

REMOTE TYPE AIR COOLED CONDENSER

Air Conditioning 10 STORIES UP!

Quiet operation is all-important when you're conditioning office space 10 stories up (and going higher), as in the Empire State Building. With basement space at a premium, units must be located in conditioned areas. Naturally, noise is taboo. Bush horizontal air handling units provide the silent answer. Why not consider the Bush line in your next air conditioning problem. Catalog No. 425 contains complete specifications. Request copy on letterhead.

Consulting engineers for office areas in Empire State Bldg. conditioned by Bush units were Meyer, Strong & Jones. Contractors—York Distributors Inc., L. I. City, New York, and J. L. Murphy, Inc., New York City, N. Y.

Bush Manufacturing Company

WEST HARTFORD 10, CONNECTICUT